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**Tuberculosis Education Program
For Long Term Care Homes**

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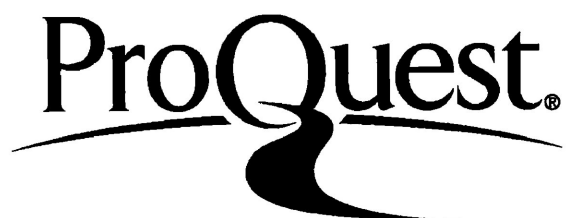
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Abstract

Outbreaks of infectious diseases, such as SARS have highlighted the importance of infection prevention and control practices. Diseases such as tuberculosis (TB) continue to persist and pose a threat if not understood and managed appropriately. Certain high risk groups exist for TB infection and disease, and the elderly are included in this group. The elderly living in long-term care homes (LTCH) are a vulnerable population and as such, these health care facilities need to be aware of and to develop plans to respond to TB within their institutions.

In Hamilton, approximately 3 to 4 cases of active TB are found each year in staff or residents of LTCH's. Based on experience working with these facilities, a knowledge gap was noted related to TB infection prevention and control practices. Hamilton Public Health Services TB Control Program conducted a learning needs assessment to help understand the gaps in knowledge for staff working in LTCHs. In addition, we were able to understand their preferred method of learning. The findings illustrated that healthcare staff working in long term care homes had a knowledge deficit related to TB. It was determined that TB education sessions should be provided when hired and at subsequent intervals to reinforce learning.

Based on this information and as suggested by the literature, a TB education program (TBEP) was developed. The goal of the TBEP is to develop and implement a comprehensive TB education program (TBEP) for LTCH healthcare staff in Hamilton by the end of 2010 to enhance TB infection prevention and control measures. Training sessions will be offered to all LTCHs in Hamilton by TB-expert public health nurse. An evaluation component has been included as an essential element to facilitate enhancements to the TBEP.

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Introduction

The Severe Acute Respiratory Syndrome (SARS) outbreak of 2003 led to an increased focus on public health practices and management, and also increased attention on infection prevention and control throughout the health care system. When the outbreak was declared over, many reports, including those written by Walker for the Ontario Ministry of Health and Long-Term Care (MOHLTC, 2003), Naylor for the Public Health Agency of Canada (PHAC, 2004) and Campbell (MOHLTC, 2006) highlighted the need for enhanced surveillance and communication, improved public health management systems, increased focus on communicable disease and infection control, continued staff education, improved leadership from the province of Ontario, and the development and implementation of best-practice guidelines for infection prevention and control.

While novel diseases pose a threat to our health care system and society, diseases that have been present for many years can prove equally as challenging if not understood and appropriately managed. In Ontario, 66 diseases make up the list of what are considered reportable to public health. These diseases, as stipulated in Reg. 559/91 under the *Health Protection and Promotion Act*, R.S.O 1990, are diseases of significance to the health of the public and as such, require action from Public Health. Tuberculosis (TB) is one such disease.

TB still exists. It presents an infection control threat regionally, nationally and internationally. New strains of drug resistant TB, TB-HIV co-infection, and outbreaks in marginalized populations have confirmed that TB will not be easily eradicated. The elderly living in long-term care homes (LTCH) are a vulnerable population and as such, these health care facilities should be aware of and develop plans to respond to TB within their institutions.

As a manager with the City of Hamilton Public Health Services, I have had the opportunity to oversee the TB Control Program since 2004. In this time, I have initiated reviews of various components of the program in order to better understand the effectiveness of our actions and also to determine areas where gaps existed within our program and services. After a review of the literature and several case investigations in staff or residents of LTCHs, it became quickly apparent that these facilities are not fully equipped to deal with cases of TB both from an infection prevention and control (IP&C) perspective but also from a staff knowledge and ability perspective.

Our goal in public health related to TB is to minimize case rates and the spread of disease. As such, our program initiated a review into how we might best support LTCHs. It was determined that staff working in these facilities needed education relevant to their current understanding of TB and that these facilities, when encountering a case of TB, would need the support of Public Health Services in the areas of IP&C, as well as case and contact management. This paper will outline a program to manage TB IP&C within long term care homes (LTCHs) in Hamilton. More specifically, following a needs assessment, this paper will outline a training and education program for staff at LTCHs.

Background

Tuberculosis

The Canadian Tuberculosis Standards (PHAC, 2007a) notes that Tuberculosis (TB) is an airborne droplet spread disease caused by a bacterium called *Mycobacterium tuberculosis*. Droplet nuclei are spread through forceful expiratory efforts such as coughing, sneezing, and singing. TB bacteria most commonly attack the lungs; however, the bacteria can affect many parts of the body including the spine, kidney, and the brain. If not treated properly, TB disease can be fatal (PHAC, 2007a).

TB Control Program for Long Term Care Homes

It is important to differentiate active TB disease from latent TB infection (LTBI). A tuberculin skin test (TST) is the common method used to detect a tuberculosis infection. However, not everyone with a positive TST will be infectious (PHAC, 2007a). Often times, people are exposed and infected with TB; yet their bodies' immune systems are able to encapsulate the TB bacteria (PHAC, 2007a). In this situation, the TB bacteria do not cause any symptoms of illness and TB cannot be spread to others. This is referred to as having a latent TB infection (LTBI). A person with a latent TB infection is considered to have a 10 to 15% chance of developing active TB within the first year following infection (PHAC, 2007a). In fact, the first two years following infection is considered to be the greatest time of risk for developing TB disease (PHAC, 2007a). After that, the risk of becoming infectious decreases, assuming that person with a LTBI is in good health (PHAC, 2007a). A weakened immune system due to a number of factors such as HIV/AIDS, transplantation, silicosis, chronic renal failure/hemodialysis, and cancer of the head and neck, can all increase the risk of TB (re)activation (PHAC, 2007a). Having an abnormal chest x-ray (CXR), diabetes mellitus or being underweight can also increase this risk (PHAC, 2007a).

Ease of transmission of TB is dependent on many factors. These factors can be grouped in two areas: patient characteristics and environmental factors (PHAC, 2007a). The Canadian TB Standards (PHAC, 2007a) note that patient characteristics that affect the number of infectious droplet nuclei per volume of air are: 1) the presence of viable bacilli in the sputum of the source case and 2) aerosolization of sputum by cough or other mechanisms. Environmental factors also affect air concentration of infectious droplet nuclei, including: 1) air circulation and ventilation, 2) the proximity to the source case, 3) the duration of exposure of susceptible individuals and 4) the susceptibility of those exposed (PHAC, 2007a).

Legislation Related to TB Control

TB is a reportable, communicable and virulent disease as defined under the *Health Protection and Promotion Act* (HPPA, R.S.O 1990). TB must be reported by physicians, health care providers, pharmacists, hospital administrators and superintendents of institutions, school principals and operators of laboratories to their local public health department (HPPA, R.S.O 1990). As such, LTCHs must report cases of TB including both those cases which are latent and those which are active to their local public health department.

Tuberculosis control is one of several public health programs mandated by the Ontario Ministry of Health and Long Term Care (MOHLTC) under the Ontario Public Health Standards (MOHLTC, 2008b). These Standards outline the minimum requirements for TB control programs and services. The goal of the Ministry of Health and Long-term Care TB prevention and control program is “to prevent or reduce the burden of tuberculosis” (MOHLTC, 2008b, p.37). This is accomplished through assessment and surveillance, health promotion, policy development, and disease prevention.

In addition to the Ontario Public Health Standards (OPHS), the MOHLTC has published the TB Prevention and Control Protocols (MOHLTC, 2008c). These and other protocols were developed in conjunction with the OPHS and are program and topic specific documents that clearly outline how health departments should operationalize specific requirements outlined in the OPHS. Several key activities related to TB case and contact investigation and management are outlined. Of particular interest to LTCHs is the need to provide annual updates on the reporting requirements, as well as ensuring annual education to health care providers regarding identifying active cases of TB and the need for prompt diagnosis, treatment and isolation to reduce transmission.

TB in the Elderly

Tuberculosis is one of the oldest and most well known infectious diseases. It continues to be the leading cause of death among all infectious diseases (Rajagopalan & Yoshikawa, 2000a). In 2006, the World Health Organization (WHO) estimated that a third of the global population was infected with *Mycobacterium Tuberculosis*. TB remains a leading cause of morbidity and mortality in areas where it is endemic; worldwide TB counts showed 9.2 million new cases and 1.7 million deaths in 2006 (WHO, 2008). Most new TB cases occur in immigrants who have arrived from TB endemic countries (PHAC, 2007a; Ontario Hospital Association/Ontario Medical Association [OHA/OMA], 2008). Hamilton is a city with a diverse population due to the number of newcomers from many different areas of the world. “TB is also an urban disease with 60% of all TB cases reported from the nine Canadian metropolitan areas of 500,000 persons or more” (OHA/OMA, 2008, p.4), including Hamilton.

In Canada, the 2007 active TB case rates were 4.7/100,000; in the 65 to 74 age range this rate rose to 6.4/100,000 and for those over 75 years of age, the rate climbed to 10.1/100,000 (PHAC, 2007a). “In 2004, the reported number of cases was highest for those aged 65 years and older” (PHAC, 2007a, p. 8). In 2004, 23% of all cases in Canada were age 65 or older (PHACa, 2007). While the rates continue to decline, the elderly still have the highest rates, making TB an important consideration in the care of older adults (PHAC, 2007a; Thrupp et al., 2004; Zevallos & Justman, 2003). Zevallos and Justman (2003) summarizing data from 15 developed European countries, note that “the excess number of TB cases among the elderly may reflect the high frequency of exposure and infection that occurred in the first few decades of the twentieth century” (p. 122). They further note that “the rate of TB disease among the elderly in nursing homes was twice as high compared with individuals in the community” (p.122).

Rajagopalan and Yoshikawa (2000b) explain that underlying medical conditions, malnutrition and decreased immune defenses make the elderly more likely to activate. Thrupp et al. (2004) state that “the elderly population that resides in nursing homes is vulnerable not just because of reactivation from prior infection, but also through acquisition of infection from other residents who develop disease” (p. 1097).

TB clinical manifestations in the elderly are more often atypical and subtle, making it harder to diagnose; delayed diagnosis leads to delayed treatment and increased transmission to other residents, staff, and volunteers (PHAC, 1996; PHAC, 2007a; Rajagopalan & Yoshikawa, 2000b; Zevallos & Justman, 2003). In addition, the elderly more often die from TB than any other age groups (Zevallos & Justman, 2003). The elderly account for a large proportion of TB cases diagnosed on autopsy (Rajagopalan & Yoshikawa, 2000b; Zevallos & Justman, 2003). Therefore, staff need to have a high degree of suspicion when assessing the elderly for TB (Zevallos & Justman, 2003). Davies (1997) noted that the elderly represent the largest group who suffer from TB in developed countries.

Hamilton’s LTCH and TB Data

In Hamilton, the incidence of TB disease during the 5-year period of 2003 to 2008 was 3.8 to 5.1 cases/100,000 population (source: Hamilton Surveillance Unit, using Statistics Canada 2001 census Hamilton population 504,559). Cases ranged in age from less than one year of age to greater than 75 years old. Approximately 7% of cases were aged 65 to 75 years, and 20% of cases were 75 years of age or older. Of these cases, 10% were residents of a long-term care facility.

Currently, Hamilton’s LTCH system is comprised 29 facilities that work with that range from housing 12 to 378 residents (average= 139) (source: M. Baird, Manager ID Program, City of Hamilton Public Health Services, personal communication, May 15, 2009). On average, public

health manages 3 to 4 active cases of TB each year found in residents and staff of LTCHs. Even though relatively rare (5 to 15% of total cases in Hamilton), cases of TB in LTCH residents and staff pose unique case management and infection control issues.

TB Infection Prevention and Control in Long Term Care Homes

As mentioned previously, TB is a communicable disease and thus, its management is of key importance to limiting nosocomial spread. Menzies, Joshi and Pai (2007) note that “TB remains a very important occupational risk for health care workers (HCW) ...this risk appears particularly high when there is increased exposure combined with inadequate infection control measures” (p. 593). The Canadian Tuberculosis Standards (PHAC, 2007a) also notes that “workers and residents in certain environments, such as long-term care and other congregate settings are at an increased risk of TB” (p. 285). This could be due to underlying medical conditions, characteristics of the environment which make airborne transmission easier and more difficult to contain, and the close living quarters associated with such facilities (PHAC, 2007a). Co-morbidities of the resident population also increases the risk of conversion to active tuberculosis (Wobeser, Yuan, Gushulak, Bickenback & Randell, 2007) and environmental factors such as crowding and poor ventilation increase the risk of transmission (Wobeser et al., 2007). Staff may be at increased risk of infection because of frequent contact with undiagnosed cases, inadequate ventilation, and lack of the correct respirators in some facilities (Menzies & Gardam, 2007). More specifically, there is difficulty with implementing isolation measures due to lack of equipment (often no single bed rooms available), residents who have dementia who may wander, the home like environment (rather than a hospital like environment), and the physical inability of residents to wear masks. All these factors lead to more challenging infection prevention and control measures. In addition, lack of awareness regarding TB by LTCH staff and the inability of staff to quickly identify TB signs and symptoms

delays diagnosis and treatment, contributing to increased transmission. TB is a disease that may often be misdiagnosed or left unidentified (PHAC, 2007a). This delayed diagnosis leads to increased rates of transmission and often large numbers of contacts that need to be traced (PHAC, 2007a). In the case of LTCHs, these contacts can include staff, patients, family members, volunteers and visitors. In addition to these issues, there is also a lack of personal protective equipment (PPE) (N95 masks with staff properly fit tested), and also a lack of baseline tuberculin skin testing on staff to determine LTBI prevalence to assist with determining conversion post exposure.

The Canadian TB Standards (PHAC, 2007a) note that contact investigations must be well organized to ensure that all contacts are appropriately identified and tested. Early identification is key to TB control in LTCHs. Rajagopalan and Yoshikawa (2000a) write that “appropriate TB prevention and control measures must be undertaken in all LTCFs providing care to the elderly, to protect residents and staff from this highly communicable disease” (p. 612).

Because TB can present such significant IP&C issues in LTCHs, several key documents outline the need for best practices related to TB in these facilities. Currently the Long-Term Care Homes Act (LTCHA, SO 2007) is being introduced in Ontario to replace the three existing pieces of legislation regulating LTCHs, namely the *Charitable Institutions Act* (RSO 1990), the *Nursing Homes Act* (RSO, 1990) and the *Homes for the Aged and Rest Homes Act* (RSO 1990). The LTCHA (s.76) specifies that training is required for all staff at the home including training in the area of IP&C. This IP&C program must include daily monitoring to detect infections in residents of the facility and measures to prevent transmission of infections. Several other documents outline IP&C measures for TB. The Ministry of Health in Ontario, TB Prevention and Control Best Practices (2006) document (formerly known as the Ontario TB Protocol) is not legislative but

provides recommendations based on best practices. In addition, the PHAC (2007a) Canadian TB Standards are an excellent resource for TB management. The Canadian TB Standards (PHAC, 2007a) outline three types of controls to be used within health care facilities- administrative controls, engineering controls and personal controls.

Administrative controls include early diagnosis and treatment, and rapid isolation (PHAC, 2007a). The Canadian TB Standards (PHAC, 2007a) notes that “it is essential that all health care facilities have a TB management program, supported at the highest administrative level” (p.326). The goal of institutional TB infection prevention and control is to “prevent transmission of TB to staff and patients” (PHAC, 2007a, p. 326). This program should be supported by policies and procedures that outline roles and responsibilities, direct staff in identifying cases of TB early, outline appropriate isolation and treatment measures, and provide guidance on environmental and personal control measures.

Engineering controls include improved ventilation in patient areas, which can include negative pressure rooms or increased air exchanges/hour. These measures can be costly and are not often found in LTCHs. In these situations where environmental controls cannot be maintained, patients may have to be transferred to health care facilities equip with the appropriate environmental controls.

Personal controls include appropriate tuberculin skin testing (TST) of staff and appropriate use of respiratory PPE (PHAC, 2007a). Health care facilities should develop and implement policies and procedures for a respiratory protection program (PHAC, 2007a). Currently, N95 respirators are the standard requirement for staff caring for a patient with active respiratory TB (PHAC, 2007a). It is also important for staff to be educated regarding this occupational risk of TB and thus, the importance of wearing an N95 respirator. Facilities must have masks present for the use of their

staff and masks should be used with all suspect cases. In addition to masking, “proper baseline tuberculin skin testing for all potentially exposed health care workers in all health care setting cannot be overemphasized” (PHAC, 2007a, p. 338). TST is the most common, and currently the most accurate, way of measuring TB infection. Baseline TST records are vital in determining if recent exposure has led to infection. In the absence of appropriate and documented baseline testing it is impossible to determine if staff has converted from a negative to a positive TST. In cases where no baseline testing is done, if a staff member is in contact with a known active case of TB and subsequently tests positive on TST, the assumption is that this exposure led to this infection (PHAC, 2007a). Therefore, the Canadian Tuberculosis Standards (PHAC, 2007a) recommends that all employees have a two-step TST (two TST, 1 to 3 weeks apart) at the time of hire and that these results should be maintained on record at the facility. Further, any worker with a positive (>10mm) TST reaction should have additional medical evaluation and a chest x-ray. Tuberculin skin testing is not routinely required annually in institutions that are considered “low-risk”, which are facilities with less than three active cases/year (PHAC, 2007a). However, tuberculin skin testing is required, following an unprotected exposure to an active case of respiratory TB. This would include “situations in which the health care worker was not wearing a respirator and the patient’s TB was undiagnosed, the patient was not in isolation and/or was not treated for a sufficient length of time” (PHAC, 2007a, p.339). In addition to staff tuberculin skin testing, all residents entering a facility should have active disease ruled out. The PHAC (2007a) recommends that all residents have a Chest x-ray (CXR) completed when admitted to a LTCH.

In addition to the administrative, engineering and personal control measures, appropriate health care worker training is essential in managing an effective TB control program (PHAC, 2007a). In areas of low TB incidence, there is an accompanying risk of loss of practical experience

and clinical expertise by health care providers to identify and manage TB (PHAC, 2007a). This loss of skill and knowledge regarding TB can result in cases going undetected for some time and lead to prolonged, difficult to control outbreaks (PHAC, 2007a). The Canadian TB Standards (2007a) recommends that staff should receive training upon hire and periodically thereafter. This training should include “awareness of epidemiologic and medical risk factors, signs and symptoms, mechanisms of transmission as well as the importance of administrative, engineering and personal controls in the prevention of transmission” (PHAC, 2007, p. 327-8).

Menzies & Gardam (2007) found that training health care workers in special settings is a very important aspect of infection prevention and control. LTCH staff should receive training at hire and periodically afterwards in TB management. They reiterated that the topics should include epidemiology, risk factors, signs and symptoms, mechanisms of transmission, and administrative, environmental and personal transmission controls. The Provincial Infectious Disease Advisory Committee for the MOHLTC (2008a) also note the importance of ongoing education and training to support good infection prevention and control practices.

Staff should also understand the rationale for and importance of tuberculin skin testing and what is involved in the screening procedures as well as the possible outcomes. In addition, they should receive information regarding their role in supporting the health department with contact tracing and offering their clients practical support. The health department should provide assistance and resources with any recommended follow-up, and to improve their skills in active case finding, infection control and policy development. On site staff education sessions should also cover prevention programs, understanding co-morbidity (underlying medical conditions) and TB risk factors. TB control programs are advised to provide assistance in planning and providing these services.

Developing an Education Program for Long-term Care Homes

It has been established that TB remains an issue for LTCHs which requires infection prevention and control planning and knowledge. Healthcare staff employed in LTCHs play an essential role in preventing and controlling TB within their facilities. Education programs must cover specific elements to be effective in aiding the staff to be prepared and knowledgeable. In addition, information must be provided in a way that is easily understood and can be translated into practice. This section will provide background information on the barriers and suggestions for overcoming them in the development of training and education for LTCHs.

Considerations for the Development of the Educational Plan

A literature search (key words: methods of education/teaching strategies/barriers to learning/culture in long term care facilities) was conducted to review what types of learning issues and barriers exist within LTCHs, in addition to which learning methods are successful when used with staff working in a long-term care type facility. Several important considerations were evident from the literature. First, there are now more people in LTCHs than ever before (Kortes-Miller et al., 2007; MacDonald, Stodel & Coulson, 2004; Menne, Ejaz, Noelker & Jones, 2007; Stoecklin et al., 1998; Teri, Huda, Gibbons, Young, van Leynseele, 2005). Second, the levels of care required in LTCH residents is increasing, including more challenging care requirements and increased complexity of care (Aylward, Stolee, Keat & Johncox, 2003; Claflin, 2005; Kortes-Miller, Habjan, Kelley & Fortier, 2007; MacDonald et al., 2004; Menne et al., 2007; Ross, Carswell, Dalziel & Aminzadeh, 2001; Stoecklin et al., 1998; Teri et al., 2005; Tryssenaar & Gray, 2004). Third, staff want to provide good care for the residents and training has been demonstrated to increase their abilities and confidence; the literature is clear that having knowledgeable staff underpins quality

service for residents (Hunter, McMillan and Conway, 2007; Kortes-Miller et al., 2007; MacDonald & Walton, 2007; Ross et al., 2001; Tryssenaar & Gray, 2004; Walker, Harrington & Cole, 2006). Further, Claflin (2005) noted that the purpose of continuing education is to enhance practice and to promote the delivery of quality health care. In summary, staff require more education to provide better service to an increasing population who has more complex medical needs than ever before.

Barriers that Impact Learning in a Long-term Care Home Setting

A literature review was conducted to understand possible factors that might impede education of staff in LTCHs. A number of factors were identified including factors related to the staff, the workplace and the information itself.

Staff barriers to learning included diverse backgrounds both culturally and professionally (MacDonald et al., 2004; MacDonald & Walton, 2007; Ross et al., 2001; Stoecklin et al., 1998; Teri et al., 2005; Tryssenaar & Gray, 2004), differing levels of pre-existing education/training (Aylward et al., 2003; Claflin, 2005; MacDonald et al., 2004; MacDonald & Walton, 2007; Menne et al., 2007; Resnick, Quinn & Baxter, 2004; Ross et al., 2001; Teri et al., 2005; Walker et al., 2006), aptitude for learning (Claflin, 2005; MacDonald et al., 2004), literacy levels (MacDonald et al., 2004; MacDonald & Walton, 2007; Ross et al., 2001), previous work and educational experience (Claflin, 2005; MacDonald et al., 2004; MacDonald & Walton, 2007), lack of motivation/staff buy-in/accountability (Hughes, 2005; Resnick et al., 2004; Ross et al., 2001), lack of confidence (Ross et al., 2001), different learning styles (Aylward et al., 2003), and transfer of knowledge to practice being a challenge (Aylward et al., 2003; Resnick et al., 2004).

In addition, there is constantly new information which in itself can pose a barrier to staying current (Walker et al., 2006). In some cases there is lack of relevant curriculum

(Kortes-Miller et al., 2007), and the issue of ongoing education maintenance is important to consider (Resnick et al., 2004).

Workplace factors that inhibit learning include increased/high workloads (Aylward et al., 2003; Hughes, 2005; MacDonald et al., 2004; MacDonald & Walton, 2007; Menne et al., 2007; Resnick et al., 2004; Tryssenaar & Gray, 2004), shift work (Claflin, 2005; Hughes, 2005; MacDonald et al., 2004; MacDonald & Walton, 2007; Walker et al., 2006), high staff turnover (Aylward et al., 2003; MacDonald et al., 2004; MacDonald & Walton, 2007; Menne et al., 2007; Resnick et al., 2004; Ross et al., 2001; Stoecklin, et al., 1998; Tryssenaar & Gray, 2004; Walker et al., 2006), an aging workforce (MacDonald et al., 2004; MacDonald & Walton, 2007), inability to attend training because staff are unable to leave regular duties (Gray, 2004; Hughes, 2005; Kortes-Miller et al., 2007; MacDonald & Walton, 2007; Resnick et al., 2004; Ross et al., 2001; Tryssenaar & Gray, 2004;), limited access to expert resources (MacDonald & Walton, 2007), lack of fiscal and human resources (Aylward et al., 2003; Hughes, 2005; Kortes-Miller et al., 2007; Ross et al., 2001; Stoecklin et al., 1998; Walker et al., 2006), lack of training space and equipment (Ross et al., 2001; Walker et al., 2006), and, in some facilities, the mentality of management/operators (Aylward et al., 2003).

In summary, certain training and education barriers exist for staff working in LTCHs. These include more people residing in LTCHs with increased complexity of care, cultural and professional diversity, different levels of preexisting education, literacy levels, previous work experience, lack of motivation, lack of confidence, different learning styles, and the ability to transfer knowledge to practice. In addition, workplace barriers that might exist include high workloads, shift work, staff turnover, aging workforce, the inability to leave the floor for training, limited access to experts, lack of fiscal and human resources, lack of training space and equipment,

and potential lack of support from management. All of these issues need consideration when developing education programs for staff.

Methods to Overcome Barriers and Promote Learning in a Long-term Care Home Setting

Target Audience

Choosing the target audience is also very important when developing training and education program. In the case of a LTCH, there are many different groups of health care staff that need to be considered. These include personal support workers, registered practical nurses, registered nurses, social workers, physiotherapists, and infection prevention and control practitioners. Although nurses registered with the CNO have a professional responsibility, all healthcare staff that interact daily with residents have a critical role in IP&C. As will be described later, the TB education program developed for LTCHs will include nurses, infection prevention and control practitioners, frontline care staff including personal support workers and facility administrators.

The Message and Timing

Another key factor to consider when developing a training and education program is the development of the message. Specific to the information being shared, it was noted that the information should be relevant and practical (MacDonald et al., 2004; Ross et al., 2001), clear and concise (Morgan et al, 2007; Tryssenaar & Gray, 2004) and based on learning needs/needs assessment (Aylward et al., 2003; Claflin, 2005; Kortes-Miller et al., 2007; MacDonald et al., 2004; Tryssenaar & Gray, 2004). Information provided should also be geared to educational levels (Morgan et al, 2007). These principles have been followed in the development of the TB education program as noted later in this paper.

In addition to developing the message, the educator must also consider when the message should be delivered. For LTCHs the literature suggests that the sessions should be easy to access and available on all shifts (MacDonald et al., 2004; MacDonald & Walton, 2007; Morgan et al., 2007; Ross et al., 2001; Stoecklin et al., 1998; Tryssenaar & Gray, 2004), that the sessions flexible and adaptable (MacDonald et al., 2004; MacDonald & Walton 2007) and that the sessions should be done on work time (Morgan et al, 2007; Stoecklin et al., 1998). Again, these principles are followed in the development of the TB education program noted below.

The Education Session Format

It is noted in the literature (Kitchie, 2003) that learners have distinct and diverse learning styles, and that a teaching strategy geared to different styles is effective in reaching a broad audience. Further, adults learn best from person and problem centered learning, active participation, group work and frequent activity changes (Bastable and Rinwalske, 2003). Fitzgerald (2003) found that lectures are useful at communicating an information foundation and facilitates subsequent meaningful group discussion. Group discussion stimulates analysis and exchange of ideas and is shown to lead to greater retention of information. Demonstration and return demonstration engages learners through visual, auditory and tactile senses and is associated with increased performance. Based on a variety of identified barriers noted above, the literature suggests that teaching methods should address different learning styles (Kitchie, 2003; MacDonald et al., 2004), should be interactive (MacDonald et al., 2004; Menne et al., 2007; Morgan et al, 2007; Tryssenaar & Gray, 2004), and should be geared to learners' educational levels (Morgan et al, 2007). In addition, the delivery method of information sharing should use a variety of mediums such as articles, videos, group activities and lecture (Menne et al., 2007; Morgan et al, 2007; Teri

et al., 2005; Tryssenaar & Gray, 2004). Other suggested mediums included using emails and paystubs (Ross et al., 2001), online learning, videoconferencing, teleconferencing (Stoecklin et al., 1998), and case studies (Kortes-Miller et al., 2007; Teri et al., 2005). A variety of education and training strategies are used in the TB education program noted below.

Prior to the use of computer technology for training and education, one should take into account access to the technology (computers) and previous computer experience. In order to be successful computers must be easy to access and use (MacDonald et al., 2004). Also, any online learning should be supported by an experienced facilitator who is readily accessible (MacDonald et al., 2004). Walker et al. (2006) tested computer based (CB) learning against instructor lead (IL) learning. Four sessions (either CB or IL) were completed and participants completed pre and post tests. At the end, certificates were provided. Findings showed that 77% had previous computer experience (not found to be statistically significant), that the CB sessions averaged 40 min where the IL sessions averaged 62 minutes (found to be statistically significant). Also, it was found that English speaking learners overall did better. Both groups significantly increased their knowledge with similar results. Some enjoyed CB because it was easy to use (95% said it was easy to use). In summary, Walker et al. (2006) stated that CB learning is convenient and cost-effective, that it presents information in a uniform and reliable manner, whereby individuals can set their own pace, and that retention rates were similar between CB and IL methods. Similarly, MacDonald & Walton (2007) noted that e-learning makes the information easily accessible, convenient and flexible. The other benefit noted was that e-learning provides significant time and cost savings. An option of e-learning is included in the TB education program detailed below.

Incentives for Participation

In the development of training and education programs one must consider the benefits to the learners and the facilities, and how the information might change or improve the outcomes. When considering educational sessions for staff working in LTCHs, it is essential to have buy-in from the staff and the facility management (Hunter et al., 2007; Kortess-Miller et al., 2007; Morgan, Haviland, Woodside & Konrad, 2007; Ross et al., 2001). Morgan et al., (2007) noted that one needs buy-in from management as a worthy investment, and that education leads to improved quality of care and increased staff retention. Menne et al. (2007) suggested that continuing education leads to increased job satisfaction which leads to decreased staff turnover, a sentiment also noted by Morgan et al. (2007) and Claflin (2005). MacDonald & Walton (2007) noted that education should focus on increasing quality of care within the facility. Morgan et al. (2007) noted that using incentives (increase in pay for education training) will increase participation but recognized that this would need management support. Taking into consideration the target audience factors, tailoring the message and consideration for the timing of the delivery of the educational program as noted previous will also assist with increasing participation.

Nurses have a professional responsibility under the College of Nurses of Ontario (CNO) to maintain certain practice standards including an Infection Prevention and Control Standard (CNO, 2008). In this practice standard, many specific standards are noted, including, but not limited to, the standard that nurses must “maintaining competence in infection control practices by accessing appropriate resources” (p. 4). Further this document notes that “quality nursing care includes safe and effective infection prevention and control practices” (p.6), and encourages employers to provide current infection control resources and implement a system

to promote information sharing. It was also noted that nursing staff should be reminded of the importance of education for their professional responsibility to provide good care and the requirements for reflective practice under the College of Nurses of Ontario (CNO) (Tryssenaar & Gray, 2004). In addition, Hughes (2005) noted that nurses should define their own learning needs as part of the CNO requirements for continuing education. Nurses need to be critical thinkers, and participate in reflective practice, seek to help staff improve care, to learn practical skills, for career development. Hughes (2005) further noted that nurses are eager to implement new ideas and in order to do this they need to feel supported and empowered by management.

For this TB education program, obtaining buy-in will be done in a variety of ways. As noted above, nurses have a professional responsibility which should motivate their participation. In addition, as noted above, staff want to do a good job and increasing their knowledge and skills will support this quality service. In order to increase participation, sessions will be offered on site with no cost to the learners or facility. Birnie (2003) found doing sessions on site with no cost allowed more staff to attend.

Also, when seeking interest in participation, Hamilton Public Health Services will work closely with LTCH administration. Currently, Hamilton Public Health Services have staff attend regular infection prevention and control meetings at each facility. At these meetings, the topic of a TB education program will be raised, followed by a letter explaining the benefits to the facility in supporting their legislative requirements as well as outlining how the TB education program can support their facilities organizational goals. Enyeart (2008) noted that often these goals include achieving outstanding reputation for customer service supported by having trained, educated staff. In addition, Hamilton Public Health Services

staff will work closely with administration and/or management at each LTCH to determine the best dates and times to offer these sessions. Food will also be provided by Hamilton Public Health Services as an incentive for staff participation.

In summary, to have a successful education program, planning needs to consider the elements of who, what, where, when and how and take into account the potential barriers noted. Healthcare staff and management at the facilities need to be in agreement of the importance of the training. Healthcare staff should also be reminded of their relevant professional responsibility related to providing quality care. The curriculum needs to be clear, relevant, and practical. It should be delivered in a manner that is appropriate to learner's educational level and be based on assessed learning needs. The sessions should be provided in times that are easily accessible to all healthcare staff, and be flexible to the needs of staff. Sessions should be held on work time, at shift change and be brief (MacDonald et al., 2004; Ross et al., 2001; Tryssenaar & Gray, 2004). The teaching strategy should be geared to different learning styles using a variety of mediums.

Hamilton LTCH IP&C Needs Assessment Related to TB

In Hamilton, Public Health Services had the opportunity to question staff from a sample of LTCHs. This provided us with information regarding current knowledge, gaps in knowledge and preferred methods of learning. These findings reiterated the need that healthcare staff at long term care homes should be provided with TB education when hired and at subsequent intervals to reinforce learning.

Historically, LTCHs and Hamilton public health have not interfaced frequently or extensively in the area of TB control. In many instances, the only collaboration between LTCHs and Hamilton Public Health Services has been when they have had a case of TB in their facility. In addition to

this contact, each year public health provides written information to LTCHs on World TB Day. This sharing of information has never been evaluated.

In order to assess the needs of healthcare staff working in LTCH in Hamilton, a survey was conducted by the Hamilton Public Health Services TB Program Staff in 2007. The purpose of this study was to identify the educational needs of long-term care nurses with respect to TB, specifically nurses' comfort and confidence with TB knowledge and skills. A quantitative methodology was used, and LTCHs were selected using random sampling. Nurses employed in the LTCH were selected using convenience and snowball sampling. Data was analyzed using descriptive statistics. This survey's data, along with documented best practice guidelines will be used to develop comprehensive infection prevention and control educational strategy for LTCH healthcare staff. Specifically, the information and feedback collected from the nurses will be used to develop education materials to help enhance knowledge of TB.

As previously mentioned there are 29 LTCHs in Hamilton. Using random sampling, six facilities were chosen to participate. Nursing students in their 4th year at McMaster University assisted with data collection as part of their nursing curriculum (4L02). A PHN from the TB team in Hamilton who holds a cross-appointment with McMaster University acted as the tutor for this work. I participated as the project champion in my role as the manager of the TB Control Program for Hamilton Public Health Services. Each randomly sampled facility was approached and asked to participate. Nursing staff responded from all six facilities. Forty-nine Tuberculosis Knowledge/Resource Needs Assessment surveys (Appendix A) were completed by nursing staff whose positions within the facilities ranged from the Director of Care, Assistant Director of Care, Nursing Manager, Education Coordinator, Registered Nurses, and Registered Practical Nurses. The majority (45) of the respondents were either registered nurses or registered practical nurses.

Nursing staff were asked about their comfort level related to their knowledge of inactive and active TB (see Figure 1 and 2). Answers were rated from not comfortable to very comfortable. The majority of nursing staff (65%) felt comfortable/very comfortable with their knowledge of inactive TB infection; that number dropped to 33% saying they were comfortable/very comfortable with their knowledge related to active TB disease.

Figure 1.

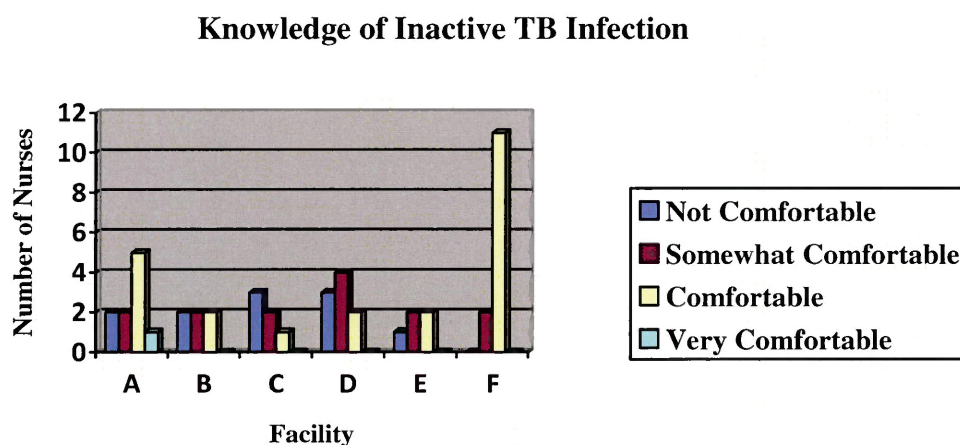
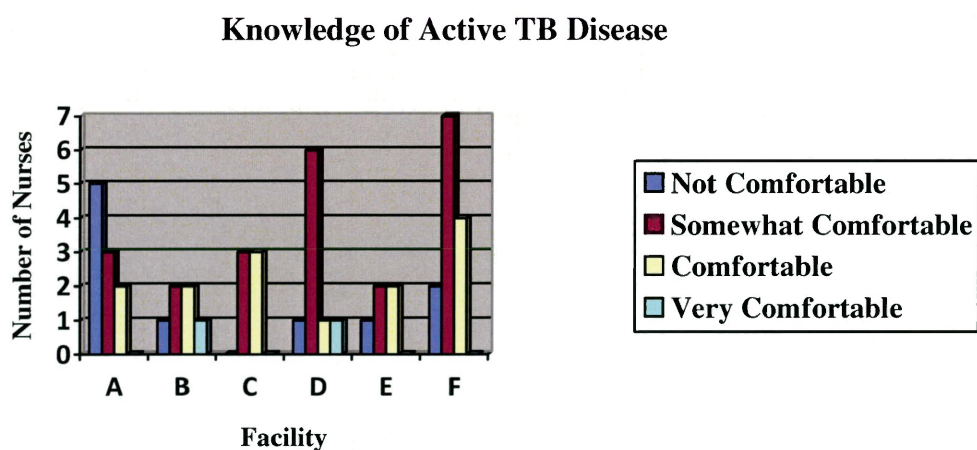


Figure 2.



Nurses were asked the frequency of encountering a resident with inactive and active TB (see Figure 3 and 4). In some facilities, few nurses felt that they frequently (10%) or very frequently (<1%) encountered inactive TB, however the majority (88%) felt that they rarely encountered inactive TB. All nurses responded that they never (53%) or rarely (47%) encountered a resident with active TB.

Figure 3.

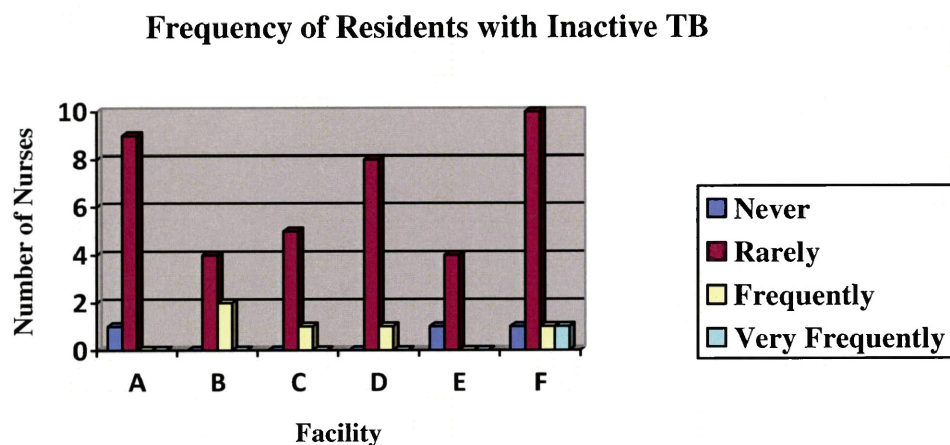
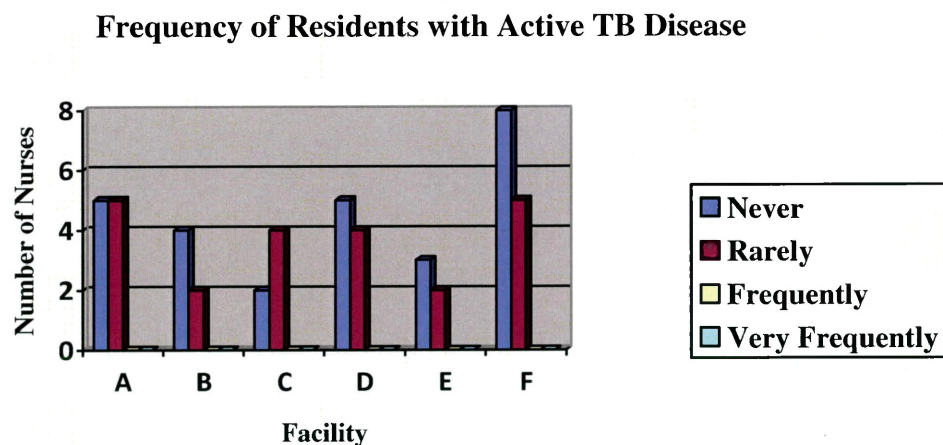


Figure 4.



Nurses were asked to rate their confidence in their ability to perform and read a tuberculin skin test (TST) (see Figure 5 and 6). As noted above, the TST is a very important assessment tool to be used for staff and residents in LTCH and must be

performed accurately to provide an accurate result. TST requires added training for nurses to properly perform and read. Most staff felt confident (41%) or very confident (33%) with their ability to perform a TST, 26% felt somewhat or not confident. Most staff felt confident (51%) or very confident (31%) in their ability to read a TST, 18% felt somewhat or not confident in this skill.

Figure 5.

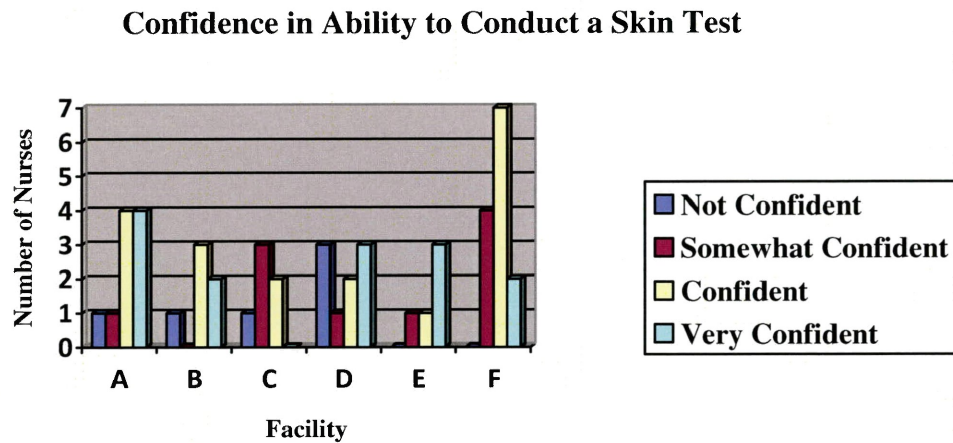
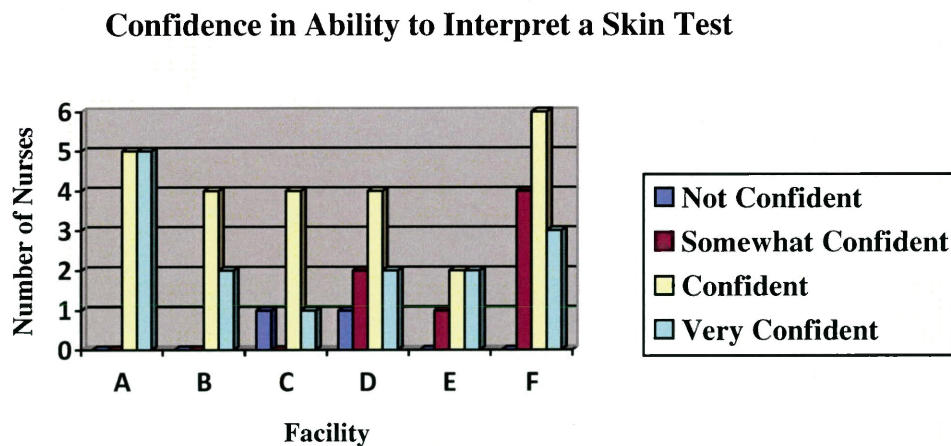


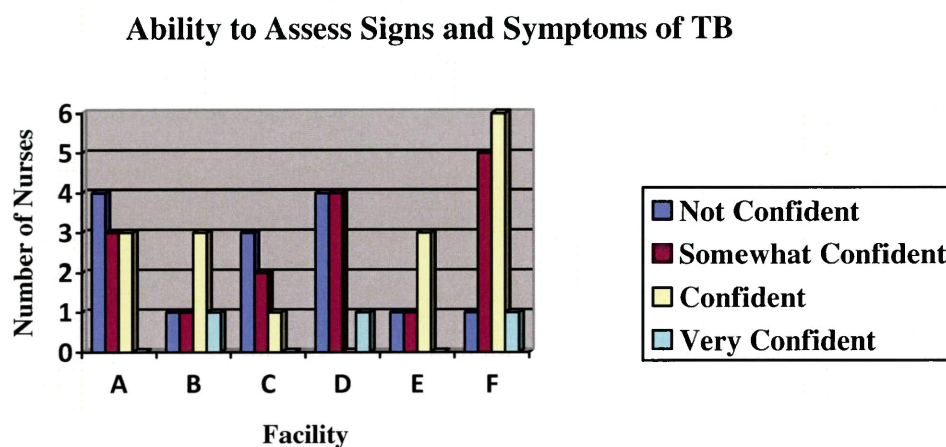
Figure 6.



The ability to quickly and accurately diagnose TB is important for good infection prevention and control. As such, we asked nurses about their confidence level in their

ability to assess for signs and symptoms of active TB (see Figure 7). The majority of nurses felt somewhat confident (47%) in their comfort level, 20% were not confident, 29% were confident, and >1% were very confident.

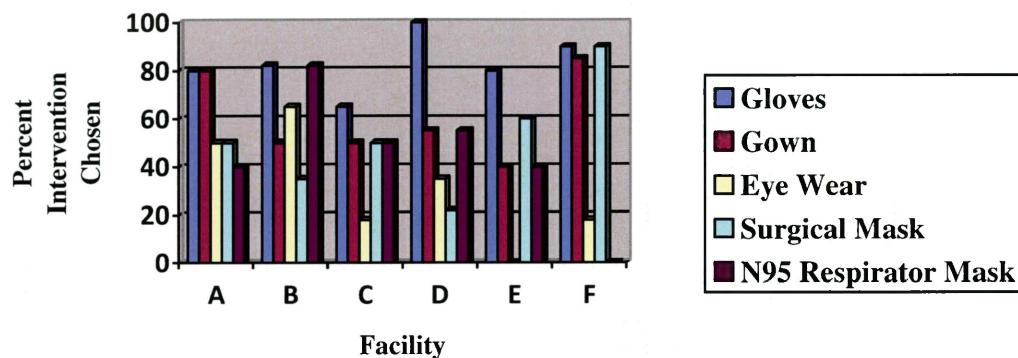
Figure 7.



Appropriate use of personal protection equipment (PPE) is also important for good infection prevention and control practices. Nurses were asked which type of PPE should be used when encountering a resident with suspected or confirmed TB (see Figure 8). Only 39% of nurses chose the correct PPE (N-95 respirator only). Note that even those individuals who selected the correct answer also selected 1 or more incorrect answers. Six nurses selected all options available except the correct answer. Most nurses selected 3 or more incorrect answers; one nurse chose none of the options. None of staff from facility F chose the correct answer, yet they had the highest average confidence level in their skills and knowledge related to TB.

Figure 8.

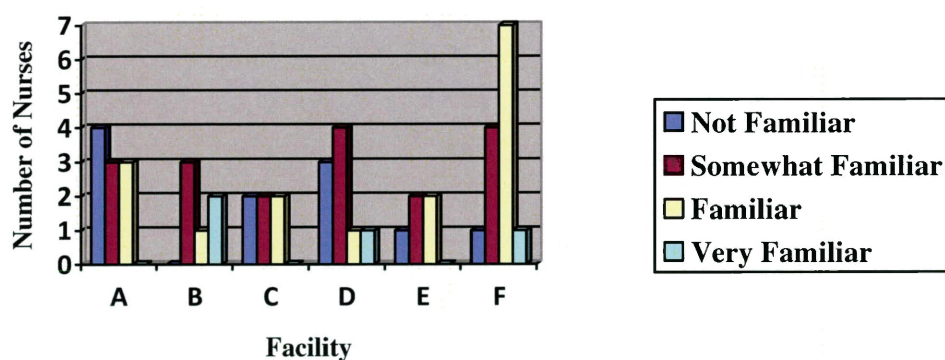
Identified PPE, Only N95 Mask is Correct



Nurses were then asked to capture how familiar they were with their facility's policies and procedures for the management of residents with suspect TB (see Figure 9). Knowledge of infection control practices related to TB management is important to minimizing the risk of spread to staff and other residents. Most staff felt somewhat familiar (37%) or familiar (33%) with their facilities policies and procedures.

Figure 9.

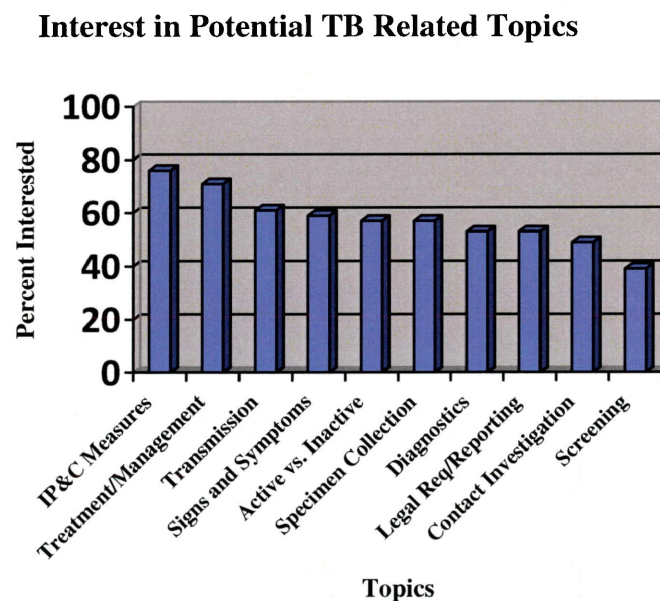
Familiarity with Facility Policies and Procedures



Nursing staff were asked about the type of information they would like to have to be more confident in their knowledge and abilities related to the screening and

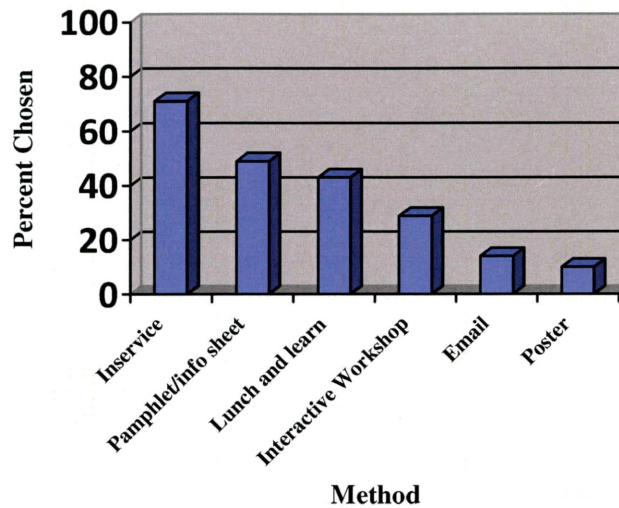
management of TB (see Figure 10). Nurses expressed an interest in learning more about a wide range of TB subtopics at all facilities. Only two topics had less than 50% of the nurse's interest- screening and contact investigation. Items that the most nurses were interested in infection prevention and control measures (76%) and treatment and management (71%).

Figure 10.



Finally, nurses were asked to check which methods they would find most effective for learning (see Figure 11). Choices were e-mail, pamphlet/information sheets, poster, in-service, lunch and learn, interactive workshop or other; multiple choices were allowed. Seventy-one percent of nurses chose in-service as a way to receive information, 49% chose pamphlets or information sheets. The least chosen option was email information. Other answers included using the internet and use of videos.

Figure 11.

Interest in Method of Learning

There is a clear knowledge deficit in Hamilton LTCH nursing staff, particularly relating to personal infection control practices. There is also a keen interest in education on active and latent TB, screening, transmission, signs and symptoms, infection control measures and management of TB. The outcome of this survey indicates that public health staff should provide leadership in institutional TB control activities by acting as educational and informational resources to LTCHs where there is increased risk of TB. These actions facilitate early identification and more efficient control of tuberculosis cases.

Staff expressed a preference for interactive learning formats. This teaching strategy is supported by the literature. It is important to consider a format which combines lectures with group discussion and demonstration/return strategies. This could include lectures or power point presentation to provide background data, followed by group discussion of case scenario's to reinforce learning with active participation. This formal training should be supplemented with demonstration and practice administering

and reading the tuberculin skin test with the public health department's practice arm. Including handouts of TB fundamentals will also reinforce learning retention. The following section will outline the curriculum and teaching formats for use within Hamilton LTCHs.

Tuberculosis Education Program for LTCH

Best Practice Recommendation

Good infection prevention and control measures are essential to ensure that TB is managed effectively within LTCHs to decrease the risk of transmission and disease. I have developed a series of best practices recommendations for TB infection prevention and control in LTCH (see Table 1). These recommendations are based on the Canadian Tuberculosis Standards (PHAC, 2007a), the Ministry of Health and Long-Term Care Prevention and Control Best Practices (2006), and the Ministry of Health and Long-term Care TB Standards (2008b) and Protocols (2008c) and provide a framework for the development of the TB education and training plan. Education of healthcare staff working at LTCHs is an essential part of ensuring an effective infection prevention and control program. Widespread references to the importance of TB education for staff, volunteers and clients were noted above.

Table 1 Summary of Best Practice Activities for TB Control in LTCHs (Developed by MMatthews)

Components	Activities
Surveillance and Case Detection	<ol style="list-style-type: none"> 1. Screening of all new residents to r/o active disease 2. Screening of all new staff and volunteers 3. Monitoring for signs and symptoms- residents, staff and volunteers
Case Management	<ol style="list-style-type: none"> 1. Ensure early isolation of suspect/active cases 2. Reporting to public health 3. Urgent referral to acute care 4. DOT for all active cases

Contact Investigation	1. Complete contact tracing of exposed residents, staff and volunteers
Screening of Staff, Volunteers and Residents	1. Baseline screening of staff/volunteers at hire and then following known exposures
Consultation, Education and Policy Development	1. Staff TB education upon hire with annual refreshers 2. Implementation of a 'cover your cough' policy
Institutional and Environmental Controls	1. Log keeping, noting residents room placement, history of activities and meal rooms 2. Improve ventilation/air circulation (open windows, fans, heat/air conditioning as appropriate), use of HEPA units 3. Limit exposure to suspects cases- single rooms

Statement of TB Education Program Goals and Objectives

The goal and objectives for this program are as follows:

Goal

The goal is to develop and implement a comprehensive TB education program (TBEP) for LTCH healthcare staff in Hamilton by the end of 2010 to enhance TB infection prevention and control measures. The TBEP will include education strategies for both nursing and non-nursing staff.

Target Audience

Healthcare staff, nurses and non-nurses working in Hamilton LTCHs.

Objectives of the TBEP for Hamilton LTCHs include,

1. To provide education to healthcare staff working in LTCH for the purpose of:
 - i. early case identification of 100% of cases to minimize spread of illness;
 - ii. ensuring appropriate care for 100% of identified cases;
 - iii. completing tuberculin skin test screening of all staff and residents;
 - iv. managing contacts appropriately to decrease risk of disease activation;
 - v. policy development to reduce TB incidence; and
 - vi. supporting the implementation of environmental controls.

Conceptual Framework

A conceptual framework was developed for this TB control program for LTCHs. It includes the necessary inputs and outputs that will be necessary to achieve the expected outcomes. This can be seen in Table 2. A detailed description of program services can be seen in the TB Control Education for LTCH Logic Model (Appendix B).

Table 2. Conceptual Framework for the TBEP for LTCH (Developed by MMatthews)

Conceptual Framework for the TBEP for LTCH				
	INPUTS	OUTPUTS	Short Tern OUTCOMES	Long Term OUTCOME
Elderly residents and staff residing or working in LTCHs are at increased risk of activation and transmission of TB	Staff Resources from Public Health	Surveillance and Case Detection	All staff will be knowledgeable regarding TB	Prevent trans- mission of TB in LTCH
	Staff Resources from LTCHs	Case Management	All residents and staff will be screened for active TB	
	Educational Resources	Contact Investigation	All suspect cases will be isolated	
	Best Practice Recommendations from Literature	Screening of Staff, Volunteers and Residents	Outbreaks will be identified quickly	
		Consultation, Education and Policy Development	All suspect /confirmed cases will be reported to public health	
		Institutional and Environmental Controls	All cases will be managed appropriately	
			All cases will have directly observed therapy (DOT)	
			All identified contacts will be screened to rule out active disease	
			All contacts with latent TB infection will be medically assessed	
			All staff will complete TST	

			upon hire and annually thereafter All staff with LTBI will be medically assessed All LTCH will have a TB control P&P All LTCH will institute a cover your cough policy All LTCH will keep a resident log of sleeping and activities All LTCHs will maximize environmental controls	
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Curriculum

A scan of published guidelines and other key documents revealed that a TB education program for LTCHs note several key topic areas. These include information on tuberculosis epidemiology, surveillance, risk factors, signs and symptoms, mechanisms of transmission and administrative, environmental and personal transmission controls (Menzies and Gardam, 2007; CDC, 2005; PHAC, 1996). More specifically the training should include (taken from CDC, 2005; PHAC, 1996):

- TB transmission, pathogenesis, signs and symptoms, diagnosis of LTBI vs. Active, re-infection, high risk groups;
- Occupational exposure, TB prevention in facility, isolation;
- IP&C P&P's;
- TST- purpose of testing, importance of baseline, pre-placement, post-exposure;
- LTBI- prophylaxis;

- Health care workers' responsibilities if they have a positive TST (including reporting if sick);
- Drug therapy;
- Isolation;
- Use of PPE; and
- Reporting suspect TB.

These topics are consistent with the learning needs identified in the Hamilton needs assessment and as such, will form the basis for the curriculum for the TBEP. The information will be kept relevant to TB in LTCH, the staff responsibilities and geared to the healthcare staff roles. The following topics will be presented while geared to staff roles and responsibilities: TB epidemiology, transmission, and risk factors, TB signs and symptoms, the difference between LTBI and active TB, TB prevention in LTCHs, infection prevention and control measures including administrative, engineering and personal measures, TB skin testing (importance of baseline, pre-placement, post-exposure), HCW's responsibilities if they have a positive TST, and how to report suspect cases of TB.

Format

Based on the suggestions from the literature and based on the suggested formats requested by staff at the LTCHs that completed the Hamilton Public Health Services survey, a multi-pronged education delivery strategy will be used for this TBEP. This will include annual TB updates to all LTCHs, in-depth in-service directed at nursing and infection prevention and control staff, on-the-unit sessions directed at front line staff working with residents including personal support workers (PSW's), written resource materials, on-line learning modules and the provision of draft policies

and procedures that can be used by LTCH administrators for the development of a effective TB IP&C program.

Currently, Hamilton Public Health Services offers an annual update in the fall each year. One of the City of Hamilton's LTCHs offers their site as a venue and all local LTCHs are invited to participate. Sessions led by Hamilton Public Health staff include a variety of infectious disease topics along with infection prevention and control measures. These sessions are well attended (50 to 100 LTCH staff each year) by nursing, non-nursing, infection control and administrative staff. For the past several years, TB has been included on this agenda and has received positive feedback. These sessions will continue and will support the more in-depth sessions that can be provided to LTCHs.

In addition to the annual update, Hamilton Public Health Services will offer in-depth in-services to nursing and infection prevention and control staff within LTCHs. These sessions will be done by TB-expert PHN using lectures, case studies and group discussions. Resources will include a TBEP power point presentation (Appendix C) and hardcopy learning resources, TB Surveillance in Long-Term Care Homes (Appendix D), TB Poster (Appendix E), TB Active vs. Latent (Appendix F), and a TB Signs and Symptoms Pocket Card (Appendix G) which will provide for both auditory and visual learning. These sessions will be offered to all facilities for free and will be done at each site wanting to participate. Each session will last approximately one hour.

On site training in each unit will also be provided to enhance the knowledge of frontline staff caring for residents of LTCHs. These staff, who work very closely with residents, play an important role in providing good infection prevention and control. It is these staff who will most likely notice signs and symptoms of illness first. As such, these sessions will focus on the areas of

signs and symptom recognition and then how to ensure that this information is reported. These sessions will be brief, less than 15 minutes and will be offered at shift change to accommodate the needs of the facility and the staff. In addition, written materials will be provided to these staff which will include the TB Posters (Appendix E) and TB Signs and Symptoms Pocket Card (Appendix G).

In addition, an online learning module covering the same material as the in-depth session will be available for staff who wish to use this method or for refreshing their knowledge. A Hamilton PHN will be available for follow-up and ongoing consultation. Updates to this module will be the responsibility of Hamilton Public Health Services, TB Control program.

To ensure a comprehensive TB infection prevention and control program, Hamilton Public Health Services will also provide consultation services for the development of LTCH TB policies and procedures. These will be based on the Tuberculosis Surveillance in Long Term Care Homes (Appendix D) document. Administrators will be offered this service through telephone contact from a Hamilton TB Control Program PHN or while onsite delivering the education program.

In order to have a successful TBEP, buy-in will need to be achieved. As noted previously, obtaining buy-in will occur in a variety of ways including focusing on providing quality care, supporting professional responsibilities, offering the sessions at no cost and on site at times determined by the facility, supporting organizational goals, and offering food.

Hamilton Public Health Services staff will table the TBEP as an agenda item at regular LTCH meetings within each facility. Following that, Hamilton Public Health Services will send a letter highlighting the TBEP and inviting participation. A follow up call will be done by Hamilton Public Health Services public health nurses (PHN's) to underscore the importance of good TB infection prevention and control practices and offer the educational session. If the facility is

interested, the PHN will negotiate a date and time for the in-depth education session, the on-the-unit sessions and also offer consultation for policy and procedure development. All sessions will be offered onsite at each facility at no charge. This will be done to increase participation as supported by Birnie (2003). A TBEP Agenda (Appendix H) and TBEP Brochure (Appendix I) will be shared with the facility. Hamilton Public Health Services will provide the trainer and the learning resources to the LTCH for the sessions. The facility will be required to provide a space suitable for the session and allow participation of staff on work time.

Outcomes

At the end of the in-depth in-service session, nurses and IP&C staff will be able to describe:

- basic TB epidemiology;
- how TB is transmitted;
- the risk factors for TB;
- the signs and symptoms of TB;
- the difference between LTBI and active TB;
- TB prevention in LTCHs;
- the need for appropriate infection prevention and control measures including administrative, engineering and personal measures;
- the purpose of TB skin testing, importance of baseline, pre-placement, post-exposure;
- health care workers' responsibilities if they have a positive TST (including reporting if sick); and
- reporting suspect TB.

At the end of the on-the-unit sessions, frontline support staff will be able to describe:

- how TB is transmitted;

- the signs and symptoms of TB; and
- reporting of suspect TB.

Any participants who participate in a session will be asked to complete a TBEP Feedback Form (Appendix J). In addition, an evaluation of the TBEP will be completed as described in the next section.

Program Evaluation

Evaluation is an essential component to any training program. It provides feedback to the trainers on the strengths and weakness of the program, allowing for improvements to be made. A TBEP Presentation Feedback Form (Appendix J) was adapted from the New Jersey Medical School Global Tuberculosis Institute (2007) to gather information from the learners regarding their opinions of the effectiveness of attaining the objectives of the training session. In addition, to further determine the effectiveness of the training, a pre and post test study design has been developed to be applied to participants of the in-depth session. This will assist in determining what and how much these participants learned during training and will allow the measurement of what is known before training and compare pre-training knowledge to what is known after the training. To do this, a Pre and Post TBEP Test Questionnaire was developed [amended (changed to Canadian terminology) from the New Jersey Medical School, Global TB Institute] (Appendix K). These questionnaires will be administered prior to and following the training. Differences found will provide a measurement on what information was learned.

Methodology

Setting

This evaluation will take place at Hamilton LTCHs who participate in the TBEP.

Research Question

Did the training session provide for increased knowledge related to TB infection, disease and control in LTCH?

Purpose

The purpose of the evaluation is to determine the effectiveness of the TBEP training sessions provided to nursing and infection prevention and control staff working in Hamilton LTCHs.

Evaluation Methodology

A PHN will arrange the TBEP training sessions as noted in the previous section. In addition, the PHN will explain the evaluation process and administer the Pre and Post TBEP Test Questionnaire (Appendix K).

Limitations

Information gathered during this evaluation will be limited to the LTCH healthcare staff that participate and will not be transferable to other healthcare staff in other healthcare settings.

Benefits

The benefit to the LTCH healthcare staff will be to increase their knowledge related to TB. The benefit to public health will be that information received from this evaluation will allow for improvement of the TBEP training session and materials.

Sample and Sampling Strategy

A convenience sample will be used to complete this evaluation. Inclusion criteria for participants include being employed as a nurse or infection prevention and control practitioner at a Hamilton LTCH and having participated in the in-depth training sessions. All staff attending the in-depth training session will be offered the opportunity to participate. There will be no

randomization of participants and participation will be voluntary. Confidentiality and privacy will be maintained by public health by ensuring that all personal information is stored on a secured system. Recruitment will occur at the LTCH before the education session.

Informed Consent

Since this evaluation will require the participation of human subjects it is of utmost importance that informed consent be obtained. This will allow the individual to make an informed decision as to their willingness to participate. The Participant Consent Form (Appendix L) would include all necessary components to ensure that informed consent is obtained. Individuals will be reminded that they are free to refuse or withdraw at any time without consequence. A participant Letter of Information (Appendix M) and Participation Consent Form (Appendix L) will be provided to all potential participants. Hamilton Public Health Services PHN's will be available to answer any questions. Only those providing signed written consent will be considered for participation.

Ethical Issues

Participants may conclude or infer from the on-site recruitment process that their employment may somehow be jeopardized or negatively affected if they do not participate in the evaluation and therefore may cause undue influence on their decision to participate. Conversely, those who refused to participate may have done so because they were concerned that any information they might provide in the study may subsequently be shared with their supervisors. In an attempt to address both aspects of this ethical component, a Participant Letter of Information (Appendix M) will be provided. PHN's will explain the letter and offer an opportunity to ask questions.

Data Collection and Analysis

The Hamilton Public Health Services TB control program will conduct the TBEP and evaluation within existing resources.

Conclusion

Recent outbreaks of infectious diseases, such as SARS have highlighted the importance of infection prevention and control practices. Old diseases such as TB continue to persist and pose a threat if not understood and managed appropriately. Certain high risk groups exist for TB infection and disease, and the elderly are included in this group. The elderly living in long-term care homes (LTCH) are a vulnerable population and as such, these health care facilities need to be aware of and to develop plans to respond to TB within their institutions.

Tuberculosis (TB) is an airborne droplet spread disease caused by a bacterium called *Mycobacterium tuberculosis*. There are two forms of TB, latent infection (LTBI) and active disease. Infection means that the bacteria is dormant and is not causing signs and symptoms; LTBI is not contagious. Approximately 10% of infected individuals go on to active TB disease in their lifetime. People with active TB are symptomatic and can infect others.

Transmission of TB is dependent on a variety of factors. These include patient factors (the presence of viable bacilli in the sputum of the source case and aerosolization of sputum by cough or other mechanisms) and environmental factors (air circulation and ventilation, proximity to the source case, duration of exposure of susceptible individuals). In addition, the susceptibility of those exposed is also an important factor in the transmission of TB (PHAC, 2007a).

Since TB is a communicable infectious disease, good infection prevention and control practices are essential. The Canadian TB Standards (PHAC, 2007a) outline three types of controls to be used within health care facilities. They are administrative controls, engineering controls and personal controls (PHAC, 2007a). Administrative controls include early diagnosis and treatment, and rapid

isolation (PHAC, 2007a). Engineering controls include improved ventilation in patient areas (PHAC, 2007a). Personal controls include appropriate tuberculin skin testing of staff and appropriate use of respirators (PHAC, 2007a).

In addition to the administrative, engineering and personal control measures, appropriate health care worker (HCW) training is essential in managing an effective TB control program (PHAC, 2007a). Staff training should be done upon hire and periodically thereafter to ensure that staff are educated and prepared to respond if needed. Education sessions should cover certain topic areas and be presented in a way that is easy to understand. In addition education sessions should be easily accessible to staff, and should be geared to different levels of staff (i.e., regulated and non-regulated staff).

In Hamilton, public health had the opportunity to question staff from a sample of LTCHs. This provided us with information regarding current knowledge, gaps in knowledge and preferred methods of learning. Based on the results, we noted a knowledge deficit in Hamilton LTCH nursing staff, particularly around personal infection prevention and control practices, and interest in education on active and latent TB, screening, transmission, signs and symptoms, infection control measures and management of TB. These findings showed that healthcare staff at long term care homes should be provided with TB education when hired and at subsequent intervals to reinforce learning.

Based on this information and the suggestions to overcome barriers noted above, a TB education program (TBEP) was developed. The goal of the TBEP is to develop and implement a comprehensive TB education program (TBEP) for LTCH healthcare staff in Hamilton by the end of 2010 to enhance TB infection prevention and control measures. The objectives are to provide education to healthcare staff working in LTCH for the purpose of early case identification,

appropriate care for identified cases, appropriate tuberculin skin test (TST) screening of all staff and residents, effective management of contacts to decrease risk of disease activation, policy development to reduce TB incidence, to support the implementation of environmental controls.

Training sessions will be offered to all LTCHs in Hamilton by TB-expert public health nurse. These sessions will be held at the facility and resources will be provided. Our hope is that by the end of each session, each learner will be able to describe basic TB epidemiology, how TB is transmitted, the risk factors for TB, the signs and symptoms of TB, the difference between LTBI and active TB, TB prevention in LTCHs, good infection prevention and control measures, the purpose of TB skin testing, HCW's responsibilities and legal responsibility of reporting suspect TB. In order to assess the effectiveness of the training sessions, an evaluation framework was suggested.

Evaluation is an essential component to any training program. In addition to asking for feedback on the training session, staff at LTCHs participating in the TBEP training session will be asked to participate in an evaluation program. This will include a pre and post test questionnaire applied before and after the training session. Information gained from this evaluation will be used to make modifications and enhance the TBEP.

TB remains a threat in LTCHs and good infection prevention and control practices are essential to manage and control this disease within these facilities. This paper defined the activities needed to ensure that LTCH have the necessary tools to perform good TB infection prevention and control. Components of a comprehensive TB control program for LTCH were outlined that will assist in the development of a program that is based on evidence. Each activity had indicators listed to measure the success of both the process and the outcomes. Finally, a TBEP was proposed with a model for implementation. In addition, an evaluation strategy was outlined to determine the

effectiveness of TB education sessions for staff at LTCH. This included an outline of the methodology, timeline and budget for this evaluation.

The timeline for implementation of this program has been delayed most recently due to the pH1N1 response. As my portfolio includes vaccine preventable diseases, TB control and infectious disease control, I was reassigned to be the lead for the mass immunization clinics. My TB and infectious disease portfolio were assigned to an acting manager during this time. Also, during the pH1N1 response, most public health services were scaled back to ensure that essential services were maintained. For the TB program, this meant that resources were dedicated only to active case and contact management, urgent referrals for immigration medical surveillance (newcomers with unusual CXR's) and directly observed therapy for active cases; presentations and promotional activities were halted. We are now resuming the scope of our program work and we are eager to implement this program. As such, we have begun contacting local LTCHs and offering TB education sessions. At present, we have two facilities who are interested in participating in early 2010. One of the TB PHNs will assume the lead on this work going forward as Hamilton Public Health Services is currently undergoing an organizational structure review that will see changes to our internal reporting structure.

The degree of success for a TBEP within the LTCH setting will rely heavily on the ability of staff from the health department and the LTCH to combine and exchange their knowledge and skills related to the implementation of best practices and guidelines for TB control measures. The insights and the relationships that exist between the staff and the residents at the LTCH serve as the most strategic point of entry for the health department. Observation and familiarity by LTCH staff with clients' health status over time can serve as the primary tool with which to conduct active case finding. The LTCH staff must predominantly be the face, the voice and the hands

through which TB control efforts are implemented, with ‘behind the scenes’ support by public health.

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APPENDIX A

Tuberculosis Knowledge/Resource Needs Assessment

The attached questionnaire has been developed to assess the educational needs of long-term care staff regarding tuberculosis. The information collected will be used to develop education materials to help enhance the knowledge of long-term care home nurses about tuberculosis. Your participation in completing this questionnaire is voluntary. It will only take five minutes to complete and your input is greatly appreciated. Any information you provide will remain confidential. If you have any questions about the project or the questionnaire, please call Liz Nash at (905) 546-2424 ext. 5799.

Thank you for your time.

TB Control Program
Public Health Services
City of Hamilton
(905) 546-2424 ext. 6636

Tuberculosis Knowledge/Resource Needs Assessment

1. Are you a nurse?
 - ☐ Yes
 - ☐ No (*At this point we would thank the person for their time and inform that we are only looking at nursing needs at this time*).
2. How comfortable do you feel with your knowledge of inactive tuberculosis (i.e. positive skin test but asymptomatic)?
 - ☐ Not comfortable
 - ☐ Somewhat comfortable
 - ☐ Comfortable
 - ☐ Very comfortable
3. How comfortable do you feel with your knowledge of active tuberculosis (i.e. positive skin test, abnormal CXR, symptomatic, etc)?
 - ☐ Not comfortable
 - ☐ Somewhat comfortable
 - ☐ Comfortable
 - ☐ Very comfortable

4. How often do you encounter a resident with inactive tuberculosis (i.e. positive skin test but asymptomatic) in your long-term care facility?

☐Never
☐Rarely
☐Frequently
☐Very frequently

5. How often do you encounter a resident with active tuberculosis (i.e. positive skin test, abnormal CXR, symptomatic, etc) in your long-term facility?

☐Never
☐Rarely
☐Frequently
☐Very frequently

6. How confident are you in your ability to conduct a skin test for tuberculosis?

☐Not confident
☐Somewhat confident
☐Confident
☐Very confident

7. How confident are you in your ability to interpret the results of a tuberculosis skin test?

☐Not confident
☐Somewhat confident
☐Confident
☐Very confident

8. How confident do you feel with your ability to assess for signs and symptoms of active tuberculosis?

☐Not confident
☐Somewhat confident
☐Confident
☐Very confident

9. If you encountered a resident with suspected or confirmed tuberculosis, what type of personal protective equipment would you use? Select all that apply.
- ☐ Gloves
 - ☐ Gown
 - ☐ Protective eye wear
 - ☐ Standard surgical mask
 - ☐ N95 respirator mask
10. How familiar are you with your facility's policies and procedure for the management of residents with suspect TB?
- ☐ Not familiar
 - ☐ Somewhat familiar
 - ☐ Familiar
 - ☐ Very familiar
11. What type of information would you like to have in order to be more confident in your knowledge and abilities related to the screening and management of tuberculosis? Select all that apply.
- ☐ Differences between active and inactive TB
 - ☐ Screening for TB – two step skin testing
 - ☐ Signs and symptoms of TB
 - ☐ Transmission of TB
 - ☐ Infection control measures (e.g. precautions for contact with suspect/active individuals, environmental controls)
 - ☐ Specimen collection and results interpretation (e.g. sputum)
 - ☐ Diagnostic/radiologic studies (e.g. chest x-ray)
 - ☐ Legislation and reporting requirements to Public Health
 - ☐ Contact investigation
 - ☐ Treatment and management of TB
 - ☐ Other (please specify): _____
12. What methods do you find most effective for learning?
- ☐ E-mail
 - ☐ Poster
 - ☐ Lunch and Learn
 - ☐ Pamphlet or information sheets
 - ☐ Interactive Workshop
 - ☐ Inservice
 - ☐ Other (please specify): _____

Please take a moment to answer the following demographic questions:

1. Are you:

- ☐ Male
- ☐ Female

2. Please identify your age:

- ☐ < 18
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 +

3. Please identify your educational background.

- ☐ Hospital-based nursing certificate
- ☐ College diploma
- ☐ University degree
- ☐ Masters
- ☐ Other (please specify): _____

4. a) What is your current College of Nurses of Ontario designation?

- ☐ RN
- ☐ RPN

b) How many years experience do you have working in this position? _____
(total years)

5. a) Please identify the capacity in which you presently work.

- ☐ RN
- ☐ RPN
- ☐ ICP
- ☐ DOC
- ☐ Administrator
- ☐ Other (please specify): _____

b) How long have you practiced in the above position? _____ (total years)

6. How long have you worked at this facility? _____ (total years)

7. a) Are you presently working full-time or part-time?

- ☐ Full-time
- ☐ Part-time

b) How many hours per week do you work? _____ hours/week



APPENDIX B

TB Control Program for LTCH LOGIC MODEL

GOAL: Provide a comprehensive Tuberculosis (TB) control program for individuals who work at, or reside in, a Hamilton LTCH to reduce transmission of respiratory TB disease.

Mandate: Ontario Ministry of Health and Long-Term Care (MOHLTC), Ontario Public Health Standards and TB Control Protocol. Active case management shall include case finding, case holding, treatment and follow-up. Developed by M. Matthews for the City of Hamilton Public Health Services

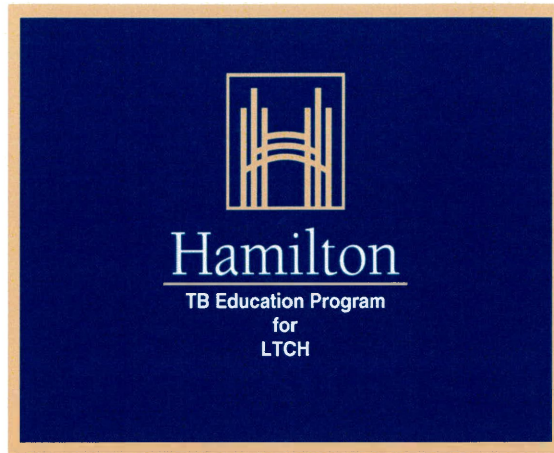
Components	Surveillance and Case Detection	Case Management	Contact Investigation	Screening of Staff, Volunteers and Residents	Consultation, Education and Policy Development	Institutional and Environmental Controls
Target Population	Staff and Residents of LTCH	Cases identified with active TB disease	Contacts of active cases.	Staff, Volunteers and Residents of LTCH	Administrators and staff working at LTCH	Administrators and staff working at LTCH
Activities	<ol style="list-style-type: none"> 1. Staff testing 2. Resident testing 3. Symptom assessment 4. Any suspect cases will be reported to Hamilton Public Health Services (PHS) for case management and contact tracing. 5. Isolate client. 	<ol style="list-style-type: none"> 1. Receive suspect case reports from LTCH staff. 2. Follow case management policy and procedure (P&P) as outlined by Hamilton PHS. (Including: ensure appropriate testing has 	<ol style="list-style-type: none"> 1. Early identification of all contacts- staff and residents 2. Determine infectivity using TST/CXR and/or sputum sampling based on individual client health history. 3. Refer all cases of Latent TB Infection (LTBI) for medical assessment. 	<ol style="list-style-type: none"> 1. All staff working at LTCH will be baseline 2-Step tested upon hire and upon exposure. 2. Any staff testing positive on TST will be referred for medical follow-up. 3. Track numbers and rates of staff testing positive on TST. 4. Maintain database (Provincial iPHIS database) to monitor conversion rates. 5. If indicated, medication 	<ol style="list-style-type: none"> 1. Develop TB educational materials for use by staff in LTCH. 2. Provide education sessions to staff at LTCH on TB. 3. Provide staff with resources to ensure that they able to monitor for signs and symptoms of active disease. 4. All new staff will be oriented to the TB education material 	<ol style="list-style-type: none"> 1. Maintain bed/activity log of residents to assist with contact tracing efforts. 2. Improve ventilation/air circulation (open windows, fans, maximize HVAC system). 3. Use of private rooms

	6. Hamilton PHS to monitor case rates in LTCH to determine trends.	been completed i.e. CXR, TST, and Sputum collection). 3. Ensure that client is isolated. 4. PHS to provide Directly Observed Therapy (DOT).	4. Manage contacts that are identified based on Hamilton Public Health Services TB Control Program Policies and Procedures.	for the treatment of LTBI will be provided by Hamilton PHS. 6. Track treatment compliance and completion. 7. Provide necessary data to ensure that Surveillance Activity #6 can be completed.	and necessary resources. 5. Assist in the development of, or review existing, TB control policies and procedures. 6. Evaluate knowledge retention from educational session. 7. Implement a 'cover your cough' policy.	
Process Indicators	Staff satisfaction with ease of symptom screening Satisfaction of LTCH and PHS staff with the reporting mechanism Ease with which PHS can enter and initiate contact investigation	PHS will continue to use existing processes outlined in P&P's Ease with which PHS staff manages TB cases in LTCH Satisfaction of LTCH and PHS with case management Client satisfaction with health services provided and	Initiation of early contact investigation following identification of new active cases by public health working with the LTCH staff Satisfaction of contacts, LTCH and PHS staff with the process of contact tracing # of contacts refusing testing and the reason for refusal	Satisfaction of LTCH staff with TB skin testing process # of staff refusing testing and reason for refusal # of staff who refuse treatment for LTBI and reason for refusal	Reported ease with which public health staff develop education materials LTCH staff satisfaction with education provided Increased knowledge base of LTCH staff regarding TB Satisfaction of LTCH staff with the development or revision of P&P Reported ease in the development and implementation of a	Reported ease by which the LTCH can implement these suggestions

		treatment regimen				'cover your cough' policy Reported quality of relationship between public health and LTCH staff	
Short Term Objectives	<p>100% of all staff will be screened on hire</p> <p>100% of residents will be screened</p> <p>100% of people who are suspect cases will be isolated</p>	<p>100% of suspect and active cases will be reported to public health within 24 hours</p> <p>100% of cases will be managed according to Hamilton PHS P&P's and MOHLTC Guidelines.</p> <p>100% of cases will have DOT for full course of treatment.</p>	<p>100% of identified contacts will have active disease ruled out</p> <p>100% of contacts identified as having LTBI will have medical assessment completed</p>	<p>100% of staff will be skin tested upon hire</p> <p>100% of staff will have repeat testing done upon exposure</p> <p>100% of staff who have positive TST will have medical follow-up to rule out active disease</p> <p>100% of staff for whom treatment is indicated will initiate treatment</p>	<p>100% of LTCH staff will have education session provided</p> <p>100% of LTCH staff will become knowledgeable on the topic of TB (signs and symptoms, the difference between infection and disease, how to report, environmental controls)</p> <p>100% of LTCH will have a current TB control P&P</p> <p>100% of LTCH will institute a 'cover your cough' policy</p>	<p>100% of LTCH will keep a bed/activity log</p> <p>100% of LTCH will maximize air circulation</p> <p>100% of LTCH will appropriate isolate</p>	
Outcome Indicators	<p># and % of staff screened on hire</p> <p># and % of residents screened on</p>	<p># of active cases successfully treated according to Hamilton P&P's and MOHLTC</p>	<p># of contacts identified</p> <p># of contacts screened</p> <p># of contacts who have active disease</p>	<p># of staff employed per shelter</p> <p># of staff tested upon hire at each shelter</p>	<p># of staff employed per LTCH</p> <p># of staff who attend education session</p>	<p># of residents per facility</p> <p># of activities completed to maximize air</p>	


	intake # of active cases found Case rate of active disease in LTCH vs. provincial and national case rates.	# of cases not completing treatment % of cases successfully treated Comparative treatment completion rates to other cases	# of contacts who have LTBI # of contacts who are negative # of contacts referred for treatment of LTBI	# of staff who required testing post exposure # and rate of staff testing positive # of staff who convert from negative to positive on skin testing # of staff who test positive that complete medical follow-up # of active cases found # of staff who are initiate treatment for LTBI # and rate of staff who complete treatment for LTBI	# of staff who can reiterate the TB education session # of LTCH who have current TB P&P pre and post consultation # of LTCH that institute a 'cover your cough' policy	circulation # of activities completed to ensure isolation
Timelines	2009 (Program development 'PD') and ongoing LTCH and Public Health	2009 PD and ongoing Public Health	2009 PD and ongoing	2009 PD and ongoing	2009 PD and ongoing	Will depend on funding in LTCH
Responsibilities	LTCH and Public Health	Public Health	LTCH Staff and Public Health	LTCH staff and Public Health	LTCH and Public Health	LTCH
Long Term objective	Reduce transmission of respiratory TB among person who live/work in targeted shelters.					

Appendix C TBEP PPT




Presentation Outline

- Epidemiology of tuberculosis (TB)
- TB transmission
- Diagnosis of LTBI vs. Active
- TB signs and symptoms
- TB Risk Factors
- TB prevention in LTCH's
- IP&C Measures
- Tuberculin skin testing
- HCW responsibilities
- Reporting of TB cases

 2


TB Epidemiology

- Canada overall, has a low incidence rate of tuberculosis (TB) disease and infection 4.7/100 000 in 2007 (total pop'l)
- In age 65-74 rate was 6.4/100 000
- 75 years and older rate was 10.1/100 000
- Areas of low incidence are at risk for periodic outbreaks due to subpopulations with higher rates of incidence

 3

TB Transmission


- TB is caused by the bacteria *Mycobacterium tuberculosis* (MTB)
- It is spread from person to person through the air
- When a person with pulmonary or laryngeal TB coughs, sneezes, or sings, droplet nuclei containing MTB are expelled into the air
- Predominantly affects the lungs, but can affect other organs
- Depending on the environment, these tiny particles can remain suspended in the air for several hours

 4

Factors Affecting Transmission

TB is not a highly infectious disease


1. Infectiousness of person with TB (number of organisms expelled in the air)
2. Environment in which the exposure occurs
3. Duration of the exposure: prolonged, frequent, or intense contact with a person with infectious TB
4. Virulence of the organism
5. Susceptibility of those exposed

 5

LTBI

- Within 2-8 weeks after infection, the immune system is usually able to stop the multiplication of the tubercule bacilli, preventing further spread
- Asymptomatic
- Will test positive on TST

INFECTED PERSONS CANNOT SPREAD DISEASE

 7

LTBI

- Within 2-8 weeks after infection, the immune system is usually able to stop the multiplication of the tubercule bacilli, preventing further spread
- Asymptomatic
- Will test positive on TST

INFECTED PERSONS CANNOT SPREAD DISEASE



7

TB DISEASE

- TB bacilli can overcome the defences of the immune system and begin to multiply, causing TB disease
- TB can cause pulmonary or extra-pulmonary disease
- Signs and Symptoms appear
- May be infectious
- Definitive diagnosis is made by culture



8

TB Signs and Symptoms

- Progressively worsening productive cough (>3 weeks duration)
- Hemoptysis
- Night sweats
- Fever
- Fatigue
- Loss of appetite
- Unexplained weight loss
- Chest pain
- May be absent in very young or the elderly



9

TB Risk Factors

Following TB infection, approximately 10% of people infected will develop active TB

- Weakened immune system (HIV/Aids ↑ risk)
- Transplantation
- Silicosis
- Chronic renal failure
- Carcinoma of head and neck
- Recent TB infection (≤ 2 years)
- Abnormal CXR- fibronodular disease
- Diabetes
- Elderly have increased risk of activating due to weakened immune system and underlying medical conditions



10

TB Prevention in LTCH

- **Administrative controls**, such as more rapid diagnosis, isolation and treatment of patients suspected of having active TB
- **Engineering controls**, such as improved ventilation in patient care areas
- **Personal controls**, such as TB skin testing of workers and use of N95 respirators



11

TB IP&C Measures

- Tuberculin skin testing
- Early identification and treatment of cases
- Isolation using airborne precautions



12

Tuberculin Skin Testing

- 0.1 mL of Tuberculin administered intradermally, bevel upon the forearm, must show a wheal/bleb
 - Needs to be read 48-72 hours after being planted
 - Measure only induration transverse to the long axis of the arm
 - A positive reaction is generally considered $\geq 10\text{mm}^*$
- * Some groups may be considered positive at less than 10mm (HIV positive, close contact of active case, children suspected of having TB disease, abnormal CXR, other immune suppressing conditions)



13

TST con't

- A positive result may last for up to 7 days
- A positive result indicates that the patient likely has TB infection
- Documentation should include the date of administration, arm of placement, lot# and expiry date of PPD solution, name/signature of administrator



14

TB Surveillance

- 2-step TST is required for all residents, staff and volunteers within 14 days of admission or hire
- Residents also require PA & Lateral CXR's
- New residents/staff/volunteers with documentation of a 2-step TST will only require a 1-step TST
- Routine repeat screening is not recommended in a LTCH
- If history of a positive TST or history of TB disease, do not do a TST. A chest x-ray and medical assessment is required to rule out TB disease
- Post-exposure TST may be required as part of contact tracing



15

Early Identification of Cases

- Flag chart if resident has a history of TB disease or positive TB skin test
- Continuously monitor these residents for symptoms of TB disease
- If suspicious, refer for immediate medical evaluation including:
 - CXR
 - Sputum samples x3 tested for AFB. Collect early morning on 3 consecutive days



16

Airborne Precautions

- If suspected or confirmed TB **immediately** start airborne precautions
- Typically airborne precautions are discontinued after 3 successive sputum samples are AFB negative



17

Airborne Precautions

For patient with suspect or confirmed TB:

- Adequately ventilated airborne isolation room
- Staff wear N95 respirators
- Discourage visitors esp. children
- Discourage movement of the patient outside of their room (dine in), if necessary to move person, they must wear a surgical mask



18

Challenges for LTCH

- Not aware of any local LTCH with required airborne isolation rooms
- If appropriate isolation facilities are not available, arrange a transfer of the resident to a health care facility equipped to manage a TB case as soon as possible



19

HCW Responsibilities

- Be educated
- Be aware- watch for residents with S&S
- Complete TST(s) upon hire
- For staff with LTBI- know what this means, be aware of your own S&S, take prophylaxis if appropriate
- Report all suspect or confirmed cases of TB to public health



20

Reporting to Public Health

- Under the *Health Protection and Promotion Act*, TB is considered a virulent, communicable and reportable disease
- All suspect and confirmed cases must be reported to Hamilton Public Health Services (HPHS)
- To report: 905-546-2063 (24/7)



21

Education = Enhanced Control

- According to the Canadian Tuberculosis Standards, public health should educate workers in high risk environments on TB management and infection control practices
- This action facilitates early identification of cases in the community and enhances control activities

Thank you for attending this session, knowledgeable workers are the key to success!



22

References

Public Health Agency of Canada. (2007). *Canadian Tuberculosis Standards 6th Edition*. Ottawa, ON: Government of Canada.

Ministry of Health and Long Term Care. (2008). *TB Control Guidelines*.



23

For more information:

Call Hamilton Public Health Services,
TB Control Program

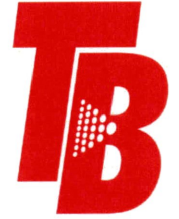
905-546-2424 x 6636



24

Appendix D

Hamilton Public Health Services Tuberculosis (TB) Surveillance in Long Term Care Homes



TUBERCULOSIS CONTROL

Long-term care institutions include homes for the aged, nursing homes, chronic care facilities, retirement homes or any other collective living centre.

Requirements for New Employees and Volunteers

The following assessment must be initiated ideally pre-placement, or within 14 days of starting work:

1. Persons whose tuberculin skin test (TST) status is unknown must have a 2-step TST, regardless of prior BCG vaccination:
 - If the TST is negative- no further testing is needed at this time. Persons with medical conditions that severely weaken the immune system, such as dialysis, HIV or cancer, may have a negative TST even though they are infected with TB. Further assessment by a physician is recommended.
 - If the TST is positive- a physical examination and chest x-ray (CXR) are indicated. Sputum should also be collected if the person is symptomatic or has an abnormal CXR. TST positive persons who are symptomatic should not work until a physician provides documentation that they are free of disease. TST positive who are asymptomatic may continue to work while waiting for a physician to rule out TB disease. So long as the person is asymptomatic, a CXR done within the last 3 months is acceptable; if the person is symptomatic a current CHX is required.
2. A single step TST is required for persons with documented results of a previous 2-step TST.
3. Persons with documented previous positive TST:
 - Should be evaluated by CXR and physical examination; no further skin testing is recommended
 - Should be informed of the signs and symptoms of TB disease and be instructed to promptly report any signs and symptoms of TB disease to their physician.
 - If diagnosed with TB disease, they must inform the infection control staff at the facility as soon as possible. Early diagnosis and treatment of TB is critical to limit spread.

Requirement for Volunteers

1. Volunteers- Testing (as above) should be done for volunteers who expect to work 150 or more hours during the next year, approximately a half day per week. Volunteers expecting to work less than 150 hours during the next year should be tested if they are from a population group with increase risk of active TB or LTBI – these include people with a weakened immune system, HIV positive, from an endemic area, history of prior contact with a known or suspected case, or have a history themselves of infection or disease.

Requirements for Students and Contract Workers

1. Students and Contract Workers- The supplying agency or school is responsible for pre-placement TST and follow-up. Facilities should clarify this with the agency or school to ensure that the staff/student has completed the necessary screening.

Requirements for Residents upon Admission to the Facility

1. All residents must undergo baseline posterior-anterior and lateral CXR on acceptance to the institution.
2. Residents must also have a 2-step TST within 14 days of admission regardless of prior BCG vaccination, unless documented results of a previous 2-step TST done within the last 6 months are available.
 - If the TST (current or previous) is negative- no further TB testing is needed once the CXR's are completed
 - If the current TST is positive- a physical examination and CXR are required. Sputum should also be collected if the person is symptomatic or has an abnormal CXR.
 - Residents with a previous positive TST should be evaluated for TB by CRX and physician examination.

Conducting Surveillance for Workers and Residents

Routine repeat TST is not recommended. Repeat CXR are not recommended in the assessment of positive reactors. Repeat testing required only if there is an infectious case or TB disease in the facility. Should this occur, contact follow-up will be coordinated by Hamilton Public Health Services. Skin testing is free for persons indentified as a contact of a case of TB disease. Medication for prophylaxis of TB (for latent TB infection) as well as treatment of active TB disease is free through Hamilton Public Health Services.

**TB infection and disease are reportable to Public Health
905.546.2063****References**

Health Canada, *Guidelines for Preventing the Transmission of Tuberculosis in Canadian Health Care Facilities and Other Institutional Settings*, 1996. Canada Communicable Disease Report 1006; 22S1.
Ministry of Health and Long-Term Care, Tuberculosis Protocol, 2006.
Public Health Agency of Canada. 2007. Canadian Tuberculosis Standards. (6th ed.) Ottawa: Public Health Agency of Canada.

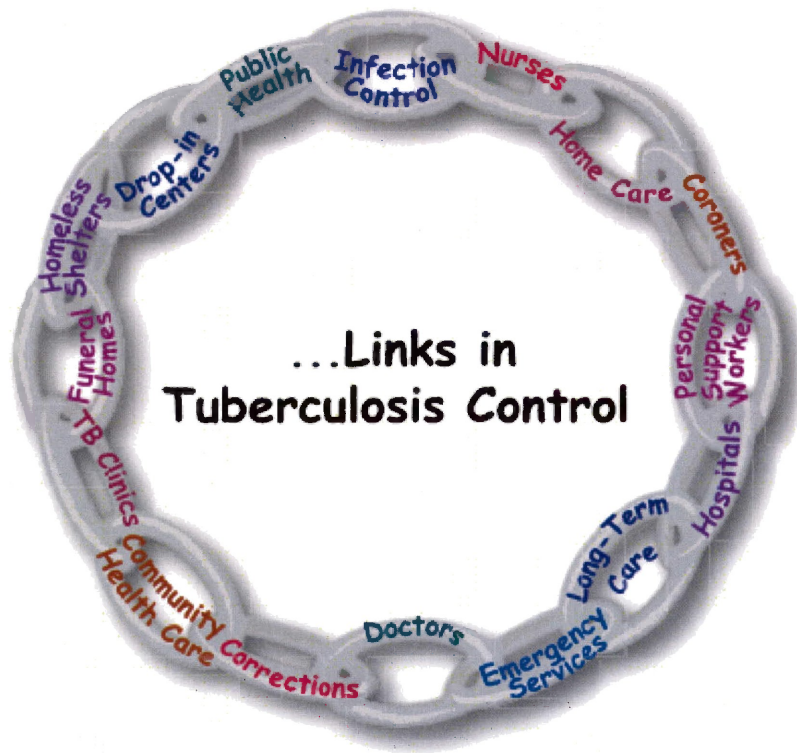
Revised November 2008.

Developed by MMatthews for the City of Hamilton Public Health Services

Appendix E TB Poster

Created by City of Hamilton, Public Health Services 2008

Front Line Workers...



THINK TB

Signs and Symptoms of TB:

Weight Loss
Loss of Appetite
Coughing for 3 weeks or More

Fatigue
Night Sweats
Fever

To report a suspect or active TB case, OR to report a positive TB skin test
call the Health Protection Branch at (905) 546-2424, ext. 6636





Appendix F TB Active vs. Latent

Created by City of Hamilton, Public Health Services 2008

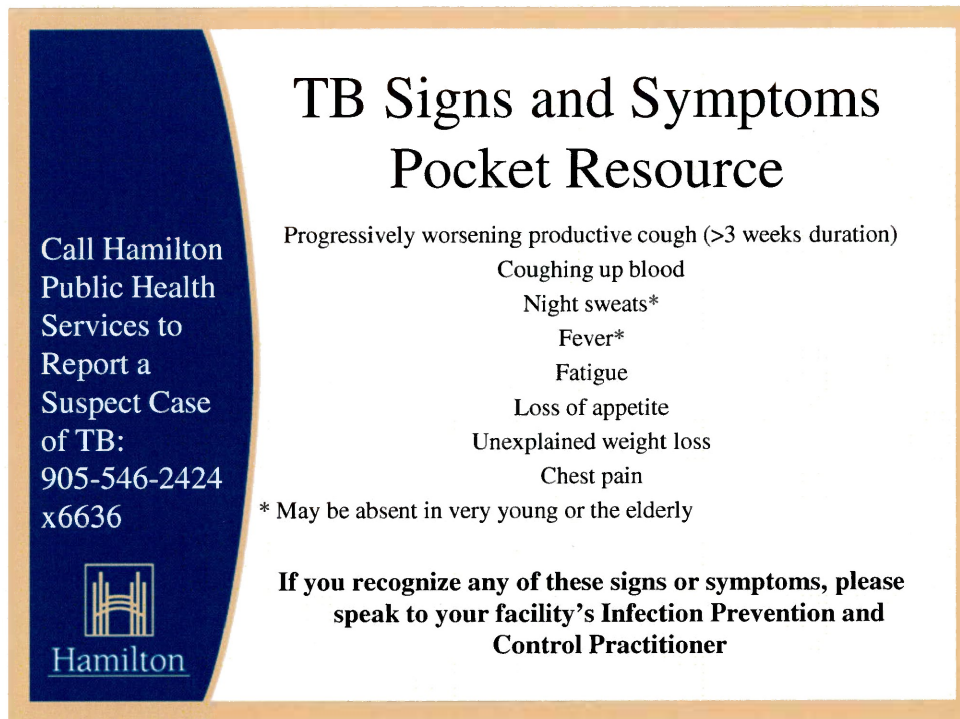
TB INFECTION and TB DISEASE		
INFECTION	vs.	DISEASE
Positive	Skin Test	Positive
Normal physical exam, no signs or symptoms of disease	Clinical Picture	Symptoms may not always be present but often include: cough > 3 wks, fatigue, loss of appetite, weight loss, night sweats, fever, chest pain, hemoptysis; lymphadenopathy; evidence of TB in other parts of the body (non-pulmonary TB). Symptoms may gradually become more severe.
Normal or granuloma	Chest X-ray	Abnormal indicating active pulmonary TB
AFB positive or negative AMTD negative Culture negative	Specimen for AFB and Culture	AFB positive or negative AMTD positive Culture positive for MTB complex
Not infectious	Infectiousness	Infectious when pulmonary or laryngeal TB
Yes	Treatable	Yes
No	Requirement to Treat	Yes
Yes	Reportable to the Medical Officer of Health	Yes
Yes	Medications for Treatment Supplied Free of Charge by Public Health Services	Yes

To report TB infection or disease call the Health Protection Division at 905-546-2424 ext. 6636
www.hamilton.ca/publichealth


Appendix G TB Signs and Symptoms Pocket Card

Created by City of Hamilton, Public Health Services 2008



The image shows a pocket card titled "TB Signs and Symptoms Pocket Resource". The card has a blue header on the left with white text and a logo. The main body is white with black text. The title is in a large, bold, serif font. Below the title is a list of symptoms, each preceded by a bullet point. A note at the bottom left of the list states that some symptoms may be absent in very young or elderly individuals. At the bottom right, there is a bold instruction to speak to a facility's Infection Prevention and Control Practitioner if any of the signs or symptoms are recognized.

**Call Hamilton
Public Health
Services to
Report a
Suspect Case
of TB:
905-546-2424
x6636**


Hamilton

TB Signs and Symptoms Pocket Resource

- Progressively worsening productive cough (>3 weeks duration)
- Coughing up blood
- Night sweats*
- Fever*
- Fatigue
- Loss of appetite
- Unexplained weight loss
- Chest pain

* May be absent in very young or the elderly

**If you recognize any of these signs or symptoms, please
speak to your facility's Infection Prevention and
Control Practitioner**

Appendix H



P.O. Box 897
Hamilton, Ontario,
Canada L8N 3P6
www.hamilton.ca/phcs

Tuberculosis Control Program
Public Health Services
Health Protection Division
1 Hughson Street North, 6th Floor, Hamilton ON L8R 3L5
Phone: 905.546.2424 ext. 6636 Fax: 905.546.4841

TUBERCULOSIS Education Program

AGENDA

8:00-8:15	Welcome and Introduction
8:15-8:30	Course Overview and Pre-test
8:30-9:15	Epidemiology of tuberculosis (TB) TB transmission Diagnosis of LTBI vs. Active TB signs and symptoms TB Risk Factors TB prevention in LTCHs IP&C Measures Tuberculin skin testing HCW responsibilities Reporting of TB cases
9:15-9:30	Post-test

Appendix I TBEP Brochure

TUBERCULOSIS Education Program for LTCH

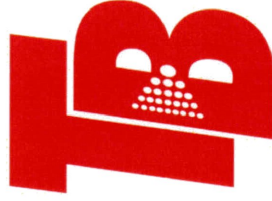
*This course is for health care staff
working in LTCHs.*

<<Date>>

Hamilton, Ontario

presented by

Hamilton Public Health Services
TB Control Program



TUBERCULOSIS CONTROL

The course covers:

- Epidemiology of tuberculosis (TB)
- TB transmission
- Diagnosis of LTBI vs. Active
- TB signs and symptoms
- TB Risk Factors
- TB prevention in LTCHs
- IP&C Measures
- Tuberculin skin testing
- HCW responsibilities
- Reporting of TB cases

Course format

Includes lecture, discussion, and case presentations. Resources will be provided. Consultation with expert TB staff.

Credit

Participants will receive a certificate of completion.

Course objectives

By the end of the course, participants will be able to describe:

- Basic TB epidemiology
- how TB is transmitted,
- the risk factors for TB,
- the signs and symptoms of TB,
- the difference between LTBI and active TB,
- TB prevention in LTCHs
- The need for appropriate infection prevention and control measures including administrative, engineering and personal measures
- The purpose of TB skin testing, importance of baseline, pre-placement, post-exposure
- HCW's responsibilities if they have a positive TST, and to report if sick
- Reporting suspect TB



Hamilton

Appendix J



Hamilton

*Hamilton Public Health Services***TUBERCULOSIS Education Program**

Presentation Feedback Form



TUBERCULOSIS CONTROL

For each item, please circle the number that indicates the degree to which the following attributes were met using the scale below:

5=Almost Always 4=Frequently 3=Occasionally 2=Seldom 1=Almost Never

1. Presentation provide useful information and was well organized 5 4 3 2 1
2. There was enough time to cover all material 5 4 3 2 1
3. Ideas were communicated clearly 5 4 3 2 1
4. Presenter(s) gave personal attention to participants when necessary 5 4 3 2 1
5. Questions were answered to my satisfaction 5 4 3 2 1
6. Presenter(s) exhibited enthusiasm and competence in the subject 5 4 3 2 1
7. I would recommend this session to others 5 4 3 2 1
8. Please provide any additional comments you have regarding the strengths/weaknesses of the presentation.

9. What changes would you make to the presentation?

10. How will this learning assist you in your job?

11. What further TB training do you need (if any)?

Adapted from:

New Jersey Medical School Global Tuberculosis Institute (2007). Mantoux Tuberculin Skin Testing Training Guide. Newark, New Jersey: New Jersey Medical School and New Jersey Department of Health and Senior Services. PP 1-96. Retrieved March 4th, 2008 from:

<http://www.umdnj.edu/globaltbproducts/mantoux.htm>

Appendix K Pre and Post TBEP Test Questionnaire



Hamilton Public Health Services
**TBEP for LTCH Presentation Pre and Post Test
Questionnaire**

Last Name: _____

First Name: _____

Please check: Pre Test ☐ Post Test ☐

- 1) Tuberculosis is caused by a:
 - a) Virus
 - b) Bacteria
 - c) Pox
 - d) Parasite
 - e) Fungus
- 2) TB infection is spread by:
 - a) Contact with blood contaminated with TB germs
 - b) Contact with clothing contaminated with TB germs
 - c) Breathing in TB germs expelled by someone with infectious TB
 - d) Eating with utensils used by a person with infectious T
 - e) All of the above
- 3) What is the most common site for TB disease?
 - a) Larynx
 - b) Pleura
 - c) Lungs
 - d) Lymph nodes
 - e) Brain
- 4) A definitive diagnosis of TB is made with a:
 - a) Tuberculin skin test
 - b) Chest x-ray
 - c) Smear
 - d) Culture
 - e) Thorough medical history
- 5) Which of the following conditions places a person at risk of developing TB disease?
 - a) Fatigue

- b) Age
 - c) Immune compromising conditions
 - d) Diabetes
 - e) B, C and D
- 6) What percentage of people will go from infection to disease?
- a) 10% in the first two years
 - b) 10% in a lifetime
 - c) 5% in the first year
 - d) 20% in a lifetime
- 7) A tuberculin skin test (TST) is administered:
- a) Intramuscularly
 - b) Intradermally
 - c) Subcutaneously
 - d) By scratching the skin
- 8) In a tuberculin skin test, the correct amount of PPD antigen to use is:
- a) 0.05 ml
 - b) 0.1 ml
 - c) 0.5 ml
 - d) 1.0 ml
- 9) After TB has been transmitted, how long does it take before TB infection can be detected by the TST?
- a) 6 months or more
 - b) 7-10 days
 - c) 2-8 weeks
 - d) 48-72 hours
- 10) When placing a TST, the bevel of the needle should be facing:
- a) Up
 - b) Down
 - c) At 90 degrees to the skin
 - d) Any direction
- 11) How long after the TST is placed should it be read?
- a) Immediately
 - b) 24-48 hours
 - c) 48-72 hours

- d) Any time up to a week
- 12) A positive reaction may still be measurable for how long after testing?
- a) 7 days
 - b) 10 days
 - c) 14 days
 - d) None of the above
- 13) When administering a TST, it is important to record the:
- a) Date
 - b) Administrator
 - c) Arm of placement
 - d) Lot # and expiry date
 - e) All of the above
- 14) When reading a TST, you measure:
- a) Erythema
 - b) Induration
 - c) Erythema and induration
- 15) In what situation is a two-step TST used?
- a) When testing HIV infected patients
 - b) When testing new employees in a TB screening program
 - c) When any patient's first TST reaction was positive
- 16) When measuring a TST, you measure:
- a) Across the arm (transverse)
 - b) Down the arm (longitudinal)
 - c) The largest measurement
 - d) The smallest measurement
- 17) A positive reaction to the TST means:
- a) The person is allergic to the PPD solution
 - b) The person probably has TB infection
 - c) The person probably has TB disease
 - d) The person has TB disease and is infectious
- 18) A person with a positive TST should be referred for:
- a) A chest x-ray
 - b) Medical evaluation for preventative therapy
 - c) Treatment for active disease

- d) Both A and B
- 19) Which statement is true about the difference between latent TB infection and TB disease?
- a) Only individuals with TB disease have tubercule bacilli in their bodies
 - b) Symptoms occur only with TB disease
 - c) TB infection is counted as a case but TB disease is not
 - d) Sputum smears and culture are positive with TB infection but not with TB disease
- 20) The difference between latent TB infection and Tb disease is that:
- a) People with latent TB infection are not infectious, whereas people with TB disease can be infections
 - b) Only TB disease can be detected by a TST; latent TB infection cannot
 - c) People with latent TB infection are infectious, whereas people with disease are not
 - d) Latent TB infection is curable but TB disease is not
- 21) Which of the following is NOT a symptom of active pulmonary TB?
- a) Productive, prolonged cough
 - b) Fever
 - c) Diarrhea
 - d) Night sweats
 - e) Weight loss
- 22) TB infection prevention and control includes:
- a) Administrative controls
 - b) Engineering controls
 - c) Personal controls
 - d) All of the above
- 23) Appropriate use of personal protective equipment when dealing with cases of infectious TB include:
- a) Gloves
 - b) Gowns
 - c) Protective eye wear
 - d) Surgical mask
 - e) N95 respirator mask
 - f) A, c, d
 - g) A, b, c, d
 - h) A, b, c, e

24) When you suspect a case of TB in your facility, you should:

- a) Monitor the client for a couple of days to see if symptoms persist and worsen
- b) Request immediate medical evaluation
- c) Ensure that a chest x-ray and sputums are completed
- d) Isolate the client
- e) B, C, and D

25) Airborne precautions include:

- a) Placing client in adequately ventilated airborne isolation
- b) Staff wearing N95 mask
- c) Discouraging visitors
- d) When moving client have them wear a surgical mask
- e) All of the above

Thank you for taking the time to complete this questionnaire.
Please turn in your test when you are finished.

Adapted from:

New Jersey Medical School Global Tuberculosis Institute. Mantoux Tuberculin Skin Testing Training Guide. Retrieved March 4, 2008 from <http://www.umdnj.edu/globaltbproducts/mantoux.htm>
and

Francis J. Curry, National Tuberculosis Center. TB Control Training Courses. Retrieved March 4, 2008 from <http://www.nationaltbcenter.ucsf.edu/catalogue/epub/index.cfm?uniqueID=41&tableName=TDPTB>

Appendix L Participant Consent Form

CONSENT TO PARTICIPATE

I have read the Participant Letter of Information, have had the details of the evaluation explained to me and have had the opportunity to ask questions. All of my questions have been answered to my satisfaction. I agree to participate in this evaluation.

I understand that I will be required to complete pre and post test questionnaires before and after the TBEP training session. I understand that any information I provide will remain confidential. I am participating in this evaluation voluntarily and as such I realize that I may withdraw my participation at any time.

I understand that I will receive a signed copy of this form.

Name of Participant

Signature of Participant

Date**Consent Form administered and explained in person by:**

Name and Title

Signature

Date**Signature of Witness to Participant's Signature:**

My signature as a witness certifies that I witnessed the participant (or the participant's legally authorized representative) voluntarily sign this consent form in my presence.

Signature

Date**SIGNATURE OF INVESTIGATOR:**

In my judgment, the participant is voluntarily and has knowingly given informed consent and possesses the legal capacity to give informed consent to participate in this evaluation.

Appendix M

PARTICIPANT LETTER OF INFORMATION***[LETTERHEAD]***

Title of Study: TBEP Training Session Evaluation

Investigator: Marcia Matthews, BScN, RN

You are being invited to participate in a tuberculosis control education program (TBEP) evaluation intervention conducted by Hamilton Public Health because you are currently employed at a LTCH in Hamilton who is receiving a TBEP training session.

In order to decide whether or not you want to be part of this intervention, you should understand what is involved and the potential risks and benefits. This form gives detailed information, about the intervention, which will be discussed with you. Once you understand the intervention, you will be asked to sign a consent form if you wish to participate. Please take your time to make your decision.

Any and all information collected throughout the process will not be shared with anyone outside of the research except with your consent or as required by law.

WHY IS THIS RESEARCH BEING DONE?

In the City of Hamilton, about 25 people get sick with TB disease each year. We know that the elderly living in LTCH are at high risk of becoming ill with TB disease. We also know that being knowledgeable in the area of TB is an effective means to decrease TB risk and transmission. Early identification of cases, appropriate surveillance and good infection control are essential. As such, Hamilton Public Health Services (HPHS) is offering TBEP training sessions to healthcare staff working in Hamilton LTCHs. To determine the effectiveness of obtaining the objectives set out for the TBEP this evaluation is being conducted.

WHAT IS THE PURPOSE OF THIS INTERVENTION?

The purpose of the study is to determine the effectiveness of obtaining the objectives set out for the TBEP for staff working in LTCHs.

WHAT WILL MY RESPONSIBILITIES BE IF I TAKE PART IN THIS STUDY?

If you volunteer to participate in this study, we ask that you complete a pre-test prior to participating in the education session and a post test following your participation in the education session. A public health nurse will administer the pre and post tests.

WHAT ARE THE DETAILS ABOUT THE Pre and Post Tests?

The pre and post tests will ask questions regarding TB and will be based on the information provided in the TBEP training session.

WHAT ARE THE POSSIBLE BENEFITS FOR ME AND/OR FOR SOCIETY?

The benefits for your participation will be an increased TB knowledge. In addition, your feedback will be used to better the TBEP and in turn.

DO I HAVE TO PARTICIPATE? ARE THERE ANY CONSEQUENCES?

It is important for you to know that you can choose not to take part in this evaluation. Choosing not to participate in this study will in no way affect your employment status.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your data will not be shared with anyone except with your consent or as required by law. All personal information such as your name and date of birth and the shelter name will be securely stored.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure. The data collected will be destroyed no later than the year 2019.

CAN PARTICIPATION IN THE STUDY END EARLY?

If you volunteer to be in this study, you may withdraw at any time without penalty. You have the option of removing your data from the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

WILL I BE PAID TO PARTICIPATE IN THIS STUDY?

If you agree to take part in this research study, you will not receive any compensation.

WILL THERE BE ANY COSTS?

No.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHO CAN I CALL?

If you have any questions about the evaluation now or later, please contact Marcia Matthews (Principal Investigator) at (XXX) XXX-XXXX Monday to Friday between the office hours of 8:30am and 4:30pm.

If you have any questions regarding your rights as a research participant, you may contact [the office of the Chair of the Research Ethics Board, XXXXXX, (XXX) XXX-XXXX.